

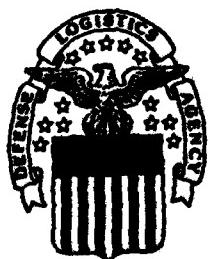
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Defense Logistics Agency  
Freight Terminal Modernization  
Cost Benefit Analysis

OPERATIONS RESEARCH AND ECONOMIC ANALYSIS OFFICE

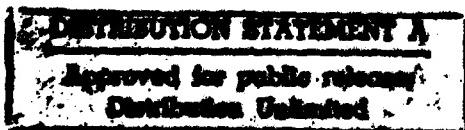


DEPARTMENT OF DEFENSE

DEFENSE LOGISTICS AGENCY

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**Defense Logistics Agency  
Freight Terminal Modernization  
Cost Benefit Analysis**

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**DEPARTMENT OF DEFENSE  
DEFENSE LOGISTICS AGENCY  
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CAMERON STATION,  
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**March 1990**



## DEFENSE LOGISTICS AGENCY

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ALEXANDRIA, VIRGINIA 22304-6100

DLA-LO

### FOREWORD

This report details the costs and benefits of modernizing the freight terminals at the six Defense Logistics Agency (DLA) depots. The current designs are not adequate to handle additional demands of unitization and increased throughput.

The results of this study indicate that several alternatives are feasible and cost effective. The study also describes in precise detail the resources required to implement each alternative. Finally, the analysis shows that an investment in large scale material handling equipment would be the best course of action for DLA. Implementing this alternative would provide DLA with the ability to meet all processing goals and afford an opportunity to experience considerable transportation savings.

CHRISTINE GALLO  
Deputy Assistant Director  
Policy and Plans

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## EXECUTIVE SUMMARY

The armed services are now beginning to request that DLA increase unitization of their shipments. The workload at the DLA depots is growing. EDDS, the Enhanced DLA Distribution System, will create transshipments which place additional workload requirements on the depot freight terminals. Some modifications in freight terminal operations will be necessary to meet these pressures. The viable options for modernizing the freight terminals fall into two basic categories, those being the addition of more personnel and/or the addition of more material handling equipment.

At the request of Directorate of Supply Operations, Depot Operations Division (DLA-OW) and Transportation Division (DLA-OT), the DLA Operations Research and Economic Analysis Management Support Office (DORO) performed a cost/benefit analysis to determine the best method for modernizing the DLA freight terminals. This report details the results of that study and provides specific information on the cost of modifications at each depot.

The results of the study indicate that the most efficient operation will be one that includes extensive mechanization in the freight terminals. This mechanization would be in the form of a large computer controlled sorter and associated conveyor systems. This equipment would sort and distribute freight within the terminal. It has many advantages over a manual type of system which would involve large increases of personnel. The mechanized alternative not only requires a minimal number of people to operate it, but also provides for better utilization of space, less damage to freight and reduction in errors due to excessive handling. The mechanized alternative does require a larger initial outlay than either the non-mechanized or commercial alternative. Specifically, the first year cost of the mechanized alternative would be almost \$29 million, as compared to \$16 million dollars for the non-mechanized alternative and \$13.8 million for the commercial alternative. However, in comparing a ten year life cycle cost of continuing current operations and the costs of the mechanized, non-mechanized and commercial alternatives the additional costs would be \$32.1 million, \$38.2 million and \$32.2 million, respectively, in discounted dollars. It is important to note that the cost of the commercial alternative does not include unitization of the freight, as this cost is not readily available. Even using very conservative estimates, though, the true total cost of the commercial alternative would be significantly higher.

The study also details the savings which can be realized by implementing the mechanized alternative in conjunction with EDDS transshipment processing. The total life cycle savings to DLA would be in excess of \$97.3 million as expressed in 1989 dollars. The cost of the mechanized alternative as already stated, is \$32.1 million, which means there would be a net savings to DLA of \$65.2 million.

I. INTRODUCTION. The Defense Logistics Agency, Directorate of Supply Operations, Office of Depot Operations (DLA-OW) requested that the DLA Operations Research and Economic Analysis Management Support Office (DORO) conduct a cost-benefit analysis of modernization/mechanization of the freight terminal operations at the six DLA operated depots. DLA-OW requested that the analysis be conducted in two parts:

Part 1 should reflect the costs and benefits of mechanizing the freight terminal for the current or base level of DLA operations. It is necessary to evaluate the amount of sortation needed to provide palletization/unitization to the destination cross reference code level.

Part 2 should reflect the costs and benefits for the additional mechanization required to handle the incremental increase above the base operations which would be generated by the Enhanced DLA Distribution System (EDDS). EDDS is a nationwide network of 11 regional consolidation and distribution centers. It will provide a new method to DLA transporters for shipping first-destination (consolidation) and second-destination (pooling) less-than-truckload (LTL) traffic in larger consolidated full truckloads. Under EDDS the depots will serve as centers for consolidation and distribution. With the addition of the EDDS workload it is necessary to evaluate increased sortation requirements as well as the opportunity to generate additional unitized freight, the ability to obtain full truckloads faster and the reduced need to hold freight for consolidation.

#### A. Background

Based on requests from the military services and the increased workload projected upon implementation of the EDDS, DLA must move toward maximum unitization of all freight leaving its depots. Unitization is purported to simplify handling of DLA freight within both the government and commercial transportation systems and allow for faster and easier unloading at properly equipped DoD facilities. Unitization can be defined as:

"... the placing of a shipping unit or units destined to the same freight address (based on the [Mechanization of Warehousing and Shipment Planning] (MOWASP) address file at the time of shipment) on a standard size pallet and securing the items by stretch wrapping, shrink wrapping, or banding to the pallet in preparation for shipment by common carrier. A pallet prepared in this manner will be considered a single unit for shipping and delivery purposes."

Current operations at the DLA depots provide for unitization of large shipment units (usually those greater than 10,000 pounds). These shipments are generally unitized at the warehouse where they are stored and shipped from the same location. This is a relatively straight forward process

since the material is going to one customer location, is a large lot, and is the same basic item. On the other hand, shipping units under 10,000 pounds are usually made up of multiple requisitions for various items going to the same customer location that have been banked in the depot computer for consolidation prior to being picked, packed, and shipped. When dropped, the requisitions are filled from various warehouses located at different points on a depot. In order for a shipping unit to achieve maximum shipping efficiency, all lines (requisitions) that were consolidated in the computer bank prior to being dropped on the depot must again be brought together and shipped as a unit to the customer. Attempts are being made at the depots to bring shipping unit lines together in the LTL pack area; however, because of the space, time, and labor needed to accomplish this task, maximum consolidation is not being achieved. This results in separate parts of the same shipping unit going out of the depot as several LTL shipments instead of one larger shipment.

The logical place for unitization to occur would be in the freight terminal. It is here that all of the freight (except small parcel and truckload shipments) passes on its way to the commercial freight system.

B. Objective. The objective of this study is to compare and contrast the costs and benefits of several alternative methods of operating DLA depot freight terminals under different material flow scenarios to achieve the best possible unitization of material for transportation and delivery.

C. Scope. The scope of this analysis parallels the request of DLA-OW as defined in I.a. and I.b. above. First, unitization is examined using only internally generated base workload. Second, the internally generated base workload is combined with the additional workload expected under EDDS. Mechanization, along with non-mechanized and commercial methods of operation were then used to estimate the cost of unitization. The depots were examined individually and as a system under the proposed alternatives.

D. Alternatives. The alternatives are based on three methods of handling different freight flows (scenarios) through DLA freight terminals. They are non-mechanized operation, mechanized operation, and the use of a commercial contractor to handle the additional EDDS workload in lieu of sending it through a freight terminal. Under each of the alternatives, except commercial, unitization is assumed to the maximum extent possible. Table 1 shows how the alternatives were examined by scenario.

Table 1

ALTERNATIVES BY SCENARIO

Alternative	Scenario		
	Current	Unitization	<u>Unitization plus EDDS</u>
NON-MECHANIZED	Base Status Quo	Base with Unitization	Base with Unitization
MECHANIZED	-	Base with Unitization	Base with Unitization
COMMERCIAL	-	-	Base with partial Unitization

E. General Assumptions

1. Sortation to achieve the unitization requirement is assumed to Destination Cross-Reference Code (DCR) level.

2. Engineered standards were assumed to be a sufficient basis for estimating manning requirements [1,2,3,4,5].

3. The data used to develop manning requirements at each depot comes from the Material Release Order (MRO) History File for the week of 14-20 March 1989. This data is assumed to be representative of a moderately heavy week of workload within the freight terminal. Other one week segments of the history file were also examined and were generally found to be consistent with the week that was chosen. Using a moderately heavy week, however, provided an opportunity to measure system requirements at the upper end of the performance scale.

4. For areas where the workload is not expected to change, i.e., air freight, small parcel processing, and weekend staffing the manning requirements supplied by the depots are used without change.

5. Estimated personnel levels are the total number of personnel needed to handle the daily throughput at a depot. They could be spread over any number of shifts. Supervisory personnel (General Schedule (GS), Wage Grade Leader (WL), and Wage Grade Supervisor (WS)) are estimated on a basis of 1 supervisory person for every 7 workers.

6. Only work that is directly related to the physical processing of freight within the freight terminal is considered in the manning requirements for each alternative. Personnel requirements for ancillary processes such as Government Bill of Lading (GBL) preparation, the challenge process, and over, short, and damage (OSD) processing are not considered in the manning requirement and are not considered as part of the cost. This was done to avoid double counting of savings anticipated with the implementation of DLA Warehousing and Shipping Procedures (DWASP) for the freight shipping process.

7. The estimated number of personnel required to perform a specific task within the freight terminal was adjusted upward by 18 percent to account for annual and sick leave requirements except where current staffing levels are used. Personnel costs are based on actual civilian wage rates by locality. All personnel costs were increased by 36.2 percent to account for fringe benefits. A factor of 29.55 percent is now considered the standard for fringe benefits. If this factor (29.55) was employed in calculating personnel costs, the overall savings would be greater than those shown.

8. For the purposes of this analysis unitization will occur at all depots in 1991. The current schedule calls for the depots to be phased into EDDS beginning in late 1990 and ending in late 1991.

9. A ten year life-cycle is assumed for all mechanization beginning in 1991. A salvage value of zero dollars is assumed at the end of the ten year life.

10. The cost of buildings and equipment already in place at the freight terminals are considered sunk cost.

11. Costs and savings are adjusted to 1989 dollars for the purpose of this analysis.

II. CONCLUSIONS. The analysis yielded the following conclusions:

A. The mechanized alternative will provide the most efficient and cost effective operation over a ten year life cycle. During the life cycle the total incremental cost for mechanization with the EDDS throughput is \$46.2 million (\$32.1 million in discounted dollars) and the transportation savings realized during this same time period would be \$166.1 million (\$97.3 million in discounted dollars). This gives DLA a net savings of over \$120.8 million (\$65.2 million in discounted dollars) for the ten year life cycle.

B. The manual alternative is feasible in terms of accomplishing the fundamental processes required. This alternative, however, does not take advantage of the accuracy afforded by current technology. This alternative would also require an approximate 74 percent increase in personnel at the depots and would cost about \$64.5 million (\$38.2 million in discounted dollars). This gives DLA a savings of over \$101.6 million (\$59.1 million in discounted dollars) for the ten year life cycle.

C. The commercial alternative is cost effective in terms of moving freight. Commercial carriers, however, are not equipped to accomplish unitization. The estimated life cycle cost of commercial operations is \$54.9 million. This does not take into consideration the additional cost of unitization which could increase the cost by as much as 20 percent. If this alternative were selected, the charge for unitization would be passed on to DLA. Savings under this alternative would be \$100 million or less. The commercial alternative as presented in this report does not meet the DLA expectations for unitization.

III. RECOMMENDATIONS. The following recommendations are made:

- A. Proceed with the plan to implement mechanization at all DLA depots.
- B. Integrate EDDS with the mechanization to take full advantage of all transportation cost savings.

IV. BENEFITS - EDDS AND NON-EDDS

Benefits can be stated in terms of both the EDDS and non-EDDS scenarios. For the non-EDDS scenario quantifiable benefits to DLA are negligible. However, the military services claim that substantial cost avoidance is possible through unitization of freight. Verification of this cost avoidance is beyond the scope of this report, therefore, no direct benefits are claimed for non-EDDS unitization.

Under the EDDS scenario, studies conducted by the DORO projected a revised total savings in transportation expenditures of \$33.3 million annually [8,9,10,]. This total is based on having both consolidation and pooling in operation under the fully implemented EDDS system. Table 2 shows a system-wide breakdown of the net estimated savings by site with individual sections for depot and commercial sites. Savings estimates are adjusted to 1989 dollars using appropriate inflation tables. For the purposes of this study, \$16.6 million is used as the total benefit attributed to depot sites under the EDDS scenario. Table 3 shows the \$16.6 million cumulative non-discounted savings as well as the associated discounted savings.

Table 2

**PROJECTED YEARLY TRANSPORTATION SAVINGS UNDER EDDS  
ADJUSTED TO 1989 DOLLARS**

DEPOT SITE	POOLING	CONSOLIDATION	TOTAL
DDMP	\$1,742,643	\$1,819,180	\$3,561,823
DDRV	2,391,503	1,377,779	3,769,282
DDCO	1,158,073	2,032,660	3,190,733
DDMT	2,628,187	1,433,995	4,062,181
DDOU	1,364,067	(19,583)	1,344,484
DDTC	772,293	(94,001)	678,291
Sub Total	10,056,764	6,550,030	16,606,794
<b>COMMERCIAL</b>			
New York	1,139,924	4,646,661	5,786,585
Chicago	927,131	1,122,507	2,049,638
Dallas	2,087,413	971,941	3,059,354
Los Angeles	2,216,590	1,885,893	4,102,483
Jacksonville	1,235,787	487,456	1,723,243
Sub Total	7,606,844	9,114,458	16,721,302
Grand Total	\$17,663,609	\$15,664,488	\$33,328,097

Table 3

**EDDS DEPOT SITE LIFE-CYCLE SAVINGS**

Year	Non-Discounted	Cumulative	Discounted	Cumulative
1991	\$16,606,794	\$ 16,606,794	\$14,398,091	\$14,398,091
1992	16,606,794	33,213,588	13,086,154	27,484,245
1993	16,606,794	49,820,382	11,907,072	39,391,316
1994	16,606,794	66,427,176	10,811,023	50,202,340
1995	16,606,794	83,033,970	9,831,222	60,033,562
1996	16,606,794	99,640,764	8,934,455	68,968,017
1997	16,606,794	116,247,558	8,120,722	77,088,740
1998	16,606,794	132,854,352	7,390,024	84,478,763
1999	16,606,794	149,461,146	6,725,752	91,204,515
2000	16,606,794	166,067,940	6,111,300	97,315,815

## V. METHODOLOGY

### A. General Methodology

An incremental approach to cost and benefit analysis is taken in this study. The current workload and staffing levels at each of the depots are used as a baseline for analysis. Each alternative is then compared to the baseline under the different scenarios. The incremental cost for each alternative scenario is then considered to be the total estimated cost for the alternative scenario minus the cost to operate under the baseline.

Cost estimations are based on the fact that each of the six DLA depots is unique in terms of facilities, floor space, and overall physical configuration. To assess the economic feasibility of the depot modernization process, it was necessary to establish consistent costing techniques applicable across the depots. This was accomplished by organizing the freight terminal process into three distinct operations common to all DLA depots. These processes are the flow of freight into the terminal, the processing of freight within the terminal, and the outloading and shipment of freight. The cost elements within each of these basic operations are classified as personnel, one-time mechanization, equipment, and maintenance costs. Mechanization refers to the large scale automated material handling machinery such as a computer controlled sorter and conveyor system. The term "equipment" in this case refers to conventional freight terminal equipment such as forklifts, jacks, and ramps. These items are currently in use and remain essentially unchanged from one alternative to the next.

B. Alternative Descriptions. There are three basic alternatives covered by this report. The first is to manually process freight through a terminal using little or no mechanization (hereinafter referred to as the "non-mechanized" alternative). The second is to install a material handling system designed to efficiently use space within the freight terminal and insure efficient processing of freight leading to maximum unitization (hereinafter referred to as the "mechanized" alternative). A third alternative, which involves the use of a commercial contractor and is used only for processing EDDS related freight, is known as the "commercial" alternative. Little, if any, unitization is considered under this alternative. Following are more detailed descriptions of each of these alternatives.

#### 1. Non-Mechanized Alternative

Under the non-mechanized alternative most of the work involved in processing the workload resulting from the unitization requirement will be handled by increasing the number of people processing freight within the freight terminal. In order to ensure a smooth flow of freight into the terminal and the capability to properly collect data and unitize the freight, some mechanization is necessary.

Manning requirements under this alternative were determined by looking at the current configuration of each depot and determining how the freight would move through each process. Once this was determined, the various throughput amounts were used in conjunction with a performance standard to estimate the number of personnel needed to perform each operation. These estimates were then evaluated to determine the grade level of the people and the type of material handling equipment (MHE) needed.

## 2. Mechanized Alternative

A second method of handling the increased workload of unitization is to install MHE in the freight terminal. This equipment would be specifically designed to address the three basic operations of input, sortation/palletization, and outloading.

Custom designed intake areas would replace the manual input process. Areas for small carton receiving, pallet receiving, depalletization, and comprehensive data collection would be installed. These areas would be mechanically linked to the other parts of the terminal to ensure a smooth flow of material. For example, cartons in need of further sortation will move directly to the sort area for processing. Full pallets will bypass the sort area and move directly to the outload area.

A large computer controlled sorter will be installed to sort cartons to approximately sixty separate locations. Many of the sort lines will have the flexibility to handle different locations from day to day based on the workload drop schedule. As cartons are sorted by location, workers will palletize the freight for shipment to either the final destination, or another consolidation site for further consolidation and shipment to the ultimate customer. The final step in the unitization process, prior to shipment, will be to stretch or shrink wrap the full pallet to make it a single unit for transportation and delivery purposes.

Finally, as pallets are built by the sorter they will move over a series of pallet conveyors designed to move the freight to a staging area for outloading. This area will be interconnected to the rest of the system so that a minimum of manual intervention will occur. At various points throughout the system, automatic barcode scanners will direct the movement of cartons/pallets through the system.

Manning requirements under the mechanized alternative were determined by looking at the mechanization designs for each depot and determining how freight would move through each process. The various throughput amounts were used in conjunction with the performance standards developed by the DLA Depot Operations Support Office (DOSO) to determine the number of people needed to perform the tasks required under mechanization. For operations that were not covered by standards developed by DOSO, performance standards for manual operations were used to estimate the number of personnel needed. These estimates were then reviewed to approximate the grade level of the personnel and the type of MHE needed to operate the freight terminal.

3. Commercial Alternative. This alternative would involve contracting out the handling of freight that is eligible to move via the EDDS system. Operations at the depot would be modified to increase unitization; however, the additional EDDS workload would be contracted to a third party. The burden of data processing and any mechanization required to handle the EDDS workload would be borne by the commercial contractor. The costs involved in the commercial operation would be based on actual throughput volume at a commercial facility. Any unitization occurring at the facility would cost over and above the cross dock handling charge. No unitization is considered to occur at the commercial facilities.

#### C. Workload Data

Workload data for unitization was developed for each depot from the MRO History file for the week of 14-20 March 1988. This week was selected because of the moderately heavy workload placed on the depots during this time of year. To prepare the data, shipping units (SU) were built by aggregating on SU number and summing the weight, cube, and pieces for each SU. The number of pallets were estimated by dividing the SU cube by 40. If the cube was greater than or equal to 40 for an individual SU, the piece count was adjusted to show a pallet as one piece for workload purposes.

SUs were retained in the database if the following were true:

1. The total aggregated weight of the SU was less than 10,000 pounds at all of the DLA depots except Memphis, TN where the threshold was set at 15,000 pounds. This is purported to emulate the movement of SUs through the freight terminal.
2. The Issue Priority Group was equal to 1, 2, or 3.
3. The stock group was not 88 or 89 (Subsistence), 91 (Petroleum, Oil, and Lubricants (POL)), or 95 (steel and related items).
4. The ship date was between 14 and 20 March, 1988.

The data was then placed in a combined SU file containing shipping data for all six depots. Further processing was accomplished to append a destination state and destination EDDS site. This file was then used to approximate the workload for each DLA depot under the stated scenarios. Vendor workload data was based on the planning data provided by the Enhanced DLA Distribution System Support Office (EDDSSO) [6].

D. Manpower Estimates. Appendices A through D contain the projected manpower requirements for four of the alternative-workload scenarios. The baseline and commercial alternatives by definition do not include manpower changes. Appendices A through D projections are based on performance standards developed by the DLA Performance Standards Support Office (DPSSO) and the DLA Depot Operations Support Office (DOSO). At each stage in the process of freight moving through the terminal, the tasks needed to

complete each operation were examined. Once this was done, the performance standards were searched for a similar operation and the necessary steps were matched to the tasks to be completed. The corresponding standard times were multiplied by the estimated frequency of occurrence for each task. This product was used to calculate the personnel required. The number of personnel needed at each stage of the process were then summed to give an estimate of the total personnel needed to operate the freight terminal. Where fractions of people were needed the fraction was rounded up to the next whole number. This was done for each depot by alternative-workload scenario.

E. Cost Estimates. Personnel costs were developed for each alternative-workload scenario by taking the manning requirements in Appendices A through D and estimating the number of each type of employee (i.e., laborer, warehouse worker, forklift operator, etc.) needed at the various stages of the throughput operation. Estimated manpower costs were determined by using the pay scale in effect at the appropriate depot being costed. Supervisory personnel (i.e., work leaders, work supervisors, etc.) are based on a 7 to 1 ratio of workers to supervisors. In addition, the number, type, and cost of equipment were similarly approximated. The estimated cost for general equipment was obtained from the MHE Cost Guide for 1987 [7]. The cost of the large scale MHE was taken directly from DOSO estimates. Yearly maintenance cost of MHE was estimated at a fixed rate of 5 percent of the installed cost for the first year of operation and 10 percent for each additional year. The total estimated cost for both equipment and personnel were then summed to give the total cost of operation at each depot and as a system.

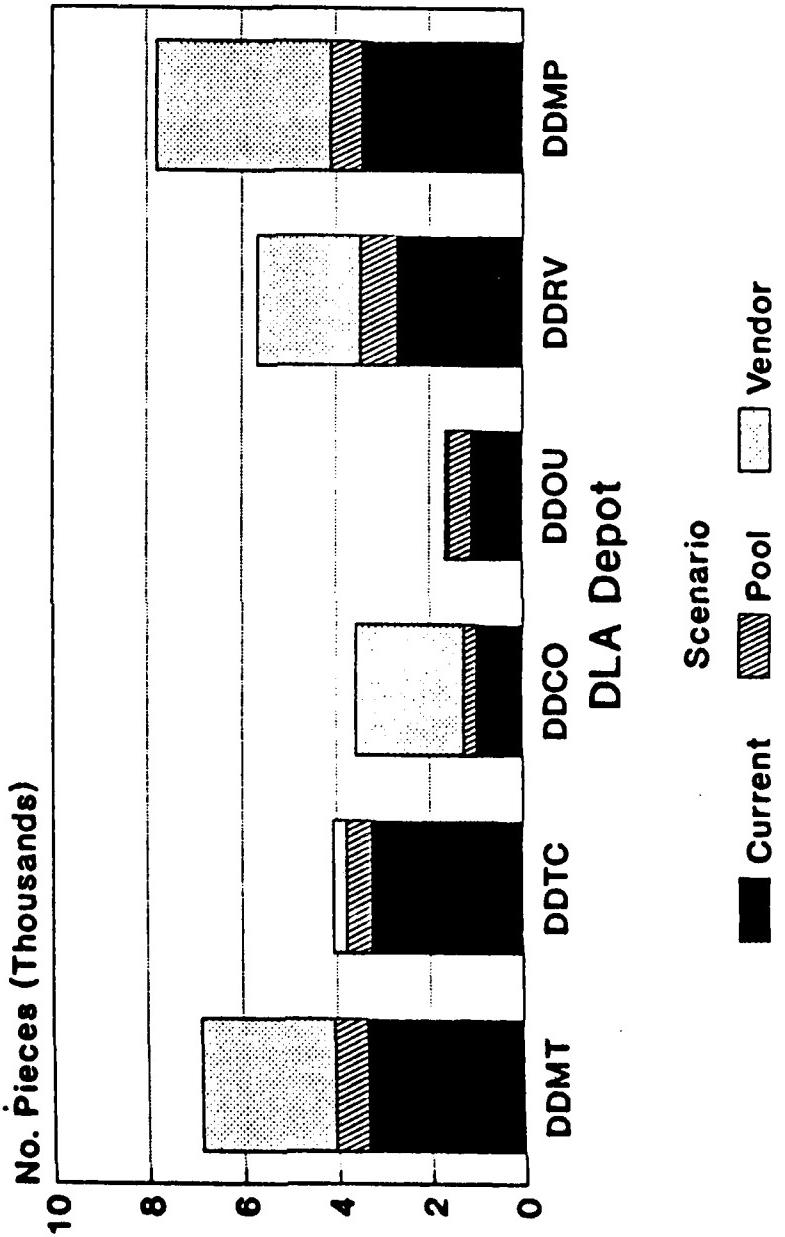
## VI. ANALYSIS

For costing the analysis is broken down into two parts. The first is the requirement for unitization without EDDS throughput. The second includes the EDDS pieces in the throughput estimates. Table 4 shows a breakdown by depot of the estimated daily piece counts attributed to the current throughput (baseline) and the EDDS volumes (pool and vendor). The difference in piece count volumes between the two different freight flows is clearly visible in this table. Piece counts refer to the estimated number of pieces (pieces and pallets) entering the freight terminal to be processed and shipped. EDDS pool and vendor pieces are transshipments that will have to be received, processed, and shipped by the freight terminals and are in addition to the internally generated depot workload. Figure 1 is a graphic representation of the current piece count and the EDDS piece count. Appendix E contains a detailed breakdown of costs by element and by depot.

Part 1 of the analysis utilizes the current throughput to determine the cost of the mechanization needs for unitization. This represents no increase in the number of pieces being processed by the freight terminals. Part 2 of the analysis includes the EDDS transshipments in determining the cost of the mechanization needs and is approximately a 100 percent increase

Figure 1

CURRENT VS EDDS SCENARIO PIECE INPUT  
Estimated Pieces Per Day



over the current workload in the freight terminals. When comparisons are made to the baseline cost of operations, the baseline costs are estimated at \$8,350,761 annually or \$83,507,610 life-cycle. These baseline costs are system-wide based on the cost of current operations at the depot freight terminals.

Table 4

ESTIMATED DAILY PIECE COUNTS BY DEPOT

DEPOT	CURRENT	POOL	VENDOR	TOTAL
DDMT	3347	703	2823	6873
DDTC	3252	540	269	4061
DDCO	989	274	2323	3586
DDOU	1092	489	66	1647
DDRV	2690	793	2176	5659
DDMP	3432	664	3690	7786
TOTAL	14,802	3,463	11,347	29,912

A. Cost Of Unitization Without EDDS Throughput

Unitization without EDDS throughput involves the processing of pieces generated internally by a depot. The level of mechanization needed to process this throughput was estimated by taking the EDDS mechanization designs for each depot and eliminating the EDDS related mechanization. The sorters were resized based on piece counts ranked by Destination Cross-Reference Code (DCR). Personnel costs were then estimated for the mechanized and non-mechanized alternatives. Some additional equipment costs are included in the non-mechanized alternative costs and are objective estimates of what may be needed to successfully accomplish unitization. Commercial operations were not considered as an alternative under this operating scenario.

Table 5 shows the total non-discounted life-cycle costs of DLA freight terminal operations under the baseline, and the mechanized and non-mechanized alternatives. Table 6 shows the same information discounted over the life-cycle of the project. Table 7 shows the total incremental life-cycle cost of operations under the non-EDDS scenario.

Table 5

TOTAL NON-DISCOUNTED LIFE-CYCLE COSTS OF  
UNITIZATION UNDER THE NON-EDDS SCENARIO

ESTIMATED LIFE-CYCLE COSTS

YEAR	<u>Baseline</u>	<u>Mechanized</u>	<u>Non-Mechanized</u>
1991	\$ 8,350,761	\$21,016,310	\$ 8,954,249
1992	8,350,761	8,026,699	8,954,249
1993	8,350,761	8,026,699	8,954,249
1994	8,350,761	8,026,699	8,954,249
1995	8,350,761	8,026,699	8,954,249
1996	8,350,761	8,026,699	8,954,249
1997	8,350,761	8,026,699	8,954,249
1998	8,350,761	8,026,699	8,954,249
1999	8,350,761	8,026,699	8,954,249
2000	8,350,761	8,026,699	8,954,249
Total	\$83,507,610	\$93,256,601	\$90,073,493

Table 6

TOTAL DISCOUNTED LIFE-CYCLE COSTS OF  
UNITIZATION UNDER THE NON-EDDS SCENARIO

ESTIMATED LIFE-CYCLE COSTS

YEAR	<u>Baseline</u>	<u>Mechanized</u>	<u>Non-Mechanized</u>
1991	\$ 7,240,110	\$18,221,141	\$ 8,223,714
1992	6,580,400	6,325,039	7,055,948
1993	5,987,496	5,755,143	6,420,197
1994	5,436,345	5,225,381	5,829,216
1995	4,943,651	4,751,806	5,300,915
1996	4,492,709	4,318,365	4,817,386
1997	4,083,522	3,925,056	4,378,628
1998	3,716,089	3,571,882	3,984,641
1999	3,382,058	3,250,813	3,626,471
2000	3,073,080	2,953,825	3,295,164
Total	\$48,935,460	\$58,298,450	\$52,932,280

Table 7

TOTAL INCREMENTAL LIFE-CYCLE COST UNDER UNITIZATION

<u>Alternative</u>	<u>Non-Discounted</u>	<u>Discounted</u>
Mechanized	\$9,748,991	\$9,362,990
Non-Mechanized	\$6,565,883	\$3,996,820

Under this operating scenario unitization is a pure cost since there are no clearly definable benefits accruing to DLA. Mechanization to accomplish unitization is estimated to cost an additional \$9,748,991 over the current baseline during its useful life. This is approximately \$3.18 million more than the estimate for non-mechanized unitization. One interesting observation relating to mechanization is that while not reducing the overall cost, it requires fewer people to accomplish the same amount of work. This may become an important consideration in future years as the personnel ceilings become more critical. Table 8 gives estimates for the number of personnel needed to operate the freight terminals under the different alternatives. It shows that a mechanized freight terminal will reduce the personnel requirement by approximately 21.9 percent.

Table 8

ESTIMATED PERSONNEL REQUIREMENTS FOR UNITIZATION  
UNDER NON-EDDS OPERATIONS

DEPOT	BASE	MECHANIZED	NON-MECHANIZED
DDMT	103	86	102
DDTC	48	31	59
DDCO	35	30	37
DDOU	49	21	26
DDRV	40	36	61
DDMP	50	50	61
TOTAL	325	254	346
INCREASE		-21.85%	6.46%

### B. Cost Of Unitization Including EDDS Throughput

Unitization under the EDDS operating scenario involves the processing of pieces generated internally by a depot, transshipments received from other depots destined to the receiving depot's distribution area (pool traffic), and transshipments received from vendors (vendor traffic) destined for the six major DLA depot central receiving activities. Table 3 shows the daily piece count estimates for pool and vendor compared to the current baseline. Under the fully implemented EDDS system the depots are expected to experience a 100 percent increase in throughput at the freight terminals. Under this operating scenario DLA is expected to receive a direct savings in transportation expenditures of approximately \$16.6 million annually. This amount is directly attributed to operations at the six DLA depot sites. Three alternatives are reviewed as possible means of achieving unitization of DLA freight.

Table 9 shows the total non-discounted life-cycle costs of DLA freight terminal operations under the baseline, and the mechanized, non-mechanized, and commercial alternatives. Table 10 shows the same information discounted over the life-cycle of the project. The baseline cost is part of the cost of each of the alternatives.

Table 9

#### TOTAL NON-DISCOUNTED LIFE-CYCLE COSTS OF UNITIZATION UNDER THE EDDS SCENARIOS

##### ESTIMATED LIFE-CYCLE COSTS

YEAR	<u>Baseline</u>	<u>Mechanized</u>	<u>Non-Mechanized</u>	<u>Commercial</u>
1991	\$ 8,350,761	\$ 28,991,619	\$ 16,004,539	\$13,841,032
1992	8,350,761	11,195,401	14,663,768	13,841,032
1993	8,350,761	11,195,401	14,663,768	13,841,032
1994	8,350,761	11,195,401	14,663,768	13,841,032
1995	8,350,761	11,195,401	14,663,768	13,841,032
1996	8,350,761	11,195,401	14,663,768	13,841,032
1997	8,350,761	11,195,401	14,663,768	13,841,032
1998	8,350,761	11,195,401	14,663,768	13,841,032
1999	8,350,761	11,195,401	14,663,768	13,841,032
2000	8,350,761	11,195,401	14,663,768	13,841,032
Total	\$83,507,610	\$129,750,228	\$147,978,451	\$138,410,320

Table 10

**TOTAL DISCOUNTED LIFE-CYCLE COSTS OF UNITIZATION  
UNDER THE EDDS SCENARIOS**

**ESTIMATED LIFE-CYCLE COSTS**

YEAR	<u>Baseline</u>	<u>Mechanized</u>	<u>Non-Mechanized</u>	<u>Commercial</u>
1991	\$ 7,240,110	\$ 25,135,734	\$ 13,875,935	\$12,000,175
1992	6,580,400	8,821,976	11,555,049	10,906,733
1993	5,987,496	8,027,103	10,513,922	9,924,020
1994	5,436,345	7,288,206	9,546,113	9,010,512
1995	4,943,651	6,627,677	8,680,951	8,193,891
1996	4,492,709	6,023,126	7,889,107	7,446,475
1997	4,083,522	5,474,551	7,170,582	6,768,265
1998	3,716,089	4,981,953	6,525,377	6,159,259
1999	3,382,058	4,534,137	5,938,826	5,605,618
2000	3,073,080	4,119,908	5,396,267	5,093,500
Total	\$48,935,459	\$81,034,371	\$87,092,129	\$81,108,448

Using these tables the incremental life-cycle cost of operating the EDDS freight terminals can be computed by subtracting the baseline costs from the total cost of each alternative, both discounted and non-discounted. Table 11 shows the total incremental life-cycle cost of operations.

Table 11

**TOTAL INCREMENTAL LIFE-CYCLE COST OF EDDS UNDER  
THE DIFFERENT ALTERNATIVES**

ALTERNATIVE	NON-DISCOUNTED	DISCOUNTED
Mechanized	\$46,242,618	\$32,098,912
Non-Mechanized	64,470,841	38,156,670
Commercial*	54,902,710	32,172,988

\* This alternative does not assume unitization beyond what is currently being done.

As can be seen, the commercial alternative appears to be more favorable than the non-mechanized. However, under this alternative a cost factor of \$2.10 per hundredweight is used to cover consolidation at the commercial sites. This does not include any unitization at the commercial site or at the DLA depots. To achieve the stated objective of "the best possible unitization of material for transportation and delivery" the estimated cost

of unitization must be factored into the commercial cost. We were unable to determine an absolute cost for commercial unitization as this service is not currently provided by commercial carriers. If we were to assume a nominal additional cost for complete commercial unitization such as 20 percent, the total incremental commercial cost would be \$54.9 million plus 20 percent, or \$65.9 million. With this additional cost factor added, the commercial alternative becomes much more costly than the mechanized alternative and as costly as the non-mechanized alternative.

#### C. Savings

Table 12 shows a comparison of present value life-cycle savings to present value life-cycle costs for the mechanized alternative. Using the figures from Table 12 and comparing the projected life-cycle depot savings (Table 2) to the least cost alternative (mechanization) the projected net life-cycle savings for mechanization with the EDDS workload is \$65,216,904 in discounted dollars. This projection indicates that substantial savings are possible through mechanization of the freight terminals under the EDDS scenario.

In addition to monetary savings, mechanization minimizes the number of personnel needed in the freight terminals to handle the additional workload created by the implementation of EDDS. Table 13 gives the estimates for the number of people needed to process the EDDS freight under the different scenarios. The commercial alternative would require the same number of people as the base if little or no additional unitization is assumed.

Table 12

CUMULATIVE TOTAL PRESENT VALUE LIFE-CYCLE SAVINGS AND COSTS  
FOR THE MECHANIZED ALTERNATIVE UNDER EDDS

YEAR	SAVINGS	COSTS	NET SAVINGS
1991	\$14,398,091	\$17,895,624	\$ (3,497,533)
1992	27,484,245	20,137,200	7,347,045
1993	39,391,316	22,176,807	17,214,509
1994	50,202,340	24,028,668	26,173,672
1995	60,033,562	25,712,694	34,320,868
1996	68,968,017	27,243,111	41,724,906
1997	77,088,740	28,634,140	48,454,600
1998	84,478,763	29,900,004	54,578,759
1999	91,204,515	31,052,083	60,152,432
2000	97,315,815	32,098,911	65,216,904

Table 13  
ESTIMATED PERSONNEL REQUIREMENTS FOR UNITIZATION  
UNDER EDDS OPERATIONS

DEPOT	BASE	MECH	NO MECH
DDMT	103	119	152
DDTC	48	36	77
DDCO	35	45	77
DDOU	49	27	40
DDRV	40	64	107
DDMP	50	72	113
TOTAL	325	363	566
INCREASE		11.69%	74.15%

As can be seen from the above totals, mechanization requires only 11.69 percent more people to process the projected 100 percent increase in workload at the DLA freight terminals. If the manual alternative were selected 74.15 percent more people would be needed.

#### D. Further Analysis

In order to determine how beneficial a selected alternative may be if implemented, several tests should be conducted. The first test is a ratio of incremental savings to incremental costs. This test gives us an idea of the amount of savings that will be realized based on the additional costs we will incur. To determine this ratio we divide the present value of the savings by the present value of the incremental life-cycle cost. A value above 1 indicates a return on investment. For the mechanized alternative under EDDS, the following computation applies:

$$\frac{\$97,315,815}{\$32,098,912} = \underline{3.03} - \text{Savings to Cost Ratio for Mechanization}$$

A second method of determining the validity of an alternative selection is the payback period of the alternative. This is determined by comparing the cumulative present value savings to the cumulative present value costs of an alternative and determining the point where the savings equal the cost. Once this point is reached, the investment begins to offer a payback to the investor. Table 12 shows the cumulative present values of savings and costs for the mechanized alternative.

Based on the data provided in Table 12, the mechanized alternative offers a payback between the first and second years of operation under the fully implemented EDDS system. More precisely, the payback occurs at 1.32 years. When compared to the non-mechanized and commercial alternatives, the mechanized alternative appears to be the best alternative for achieving unitization within DLA.

E. Comparison Of The Two Operating Scenarios. When comparing the two operating scenarios, EDDS versus non-EDDS, it is clear that the proposed EDDS scenario offers the most direct benefit to DLA. Non-EDDS unitization, while claimed to provide benefit to the services, is a pure cost to DLA. On the other hand, consolidation under the EDDS scenario with mechanization shows a present value net life-cycle savings to DLA of \$65.2 million dollars. In addition, the EDDS scenario will pay for the unitization desired by the services while providing direct savings to DLA. One important observation noted was the fact that the mechanization needed for unitization under the EDDS scenario will cost DLA approximately \$18 million, while the non-EDDS unitization costs are \$13 million. This is a difference of only \$5 million which indicates that DLA can achieve a \$16.6 million annual transportation savings for \$5 million assuming unitization is a military service requirement.

## APPENDIX A

### Methodology For Manning Non-Mechanized Freight Terminal Under Unitization

#### Internal Workload Only

Manning requirements were developed for each freight terminal assuming that unitization would be accomplished manually in the freight terminal. Since this is not currently being done at any of the freight terminals there are no schematic designs available to determine where the various functions will be performed. We assumed that the same basic functions will occur at each depot with only the volumes changing. In addition, we assumed that some minimal mechanization will be installed to handle some requirements under unitization. Engineered standards were then used to determine manpower needs based on the throughput and work performed within a specific area. For work that will be new to the freight terminal (i.e., building of pallets, and manual sortation) either the standards developed by the Depot Operations Support Office (DOSO) for the mechanized operation or a newly developed work measurement was used. For work that is currently done in the freight terminal, standards developed by the DLA Performance Standards Support Office (DPSSO) were applied. Where the DPSSO standards are used, the steps to perform the work were reviewed and only those steps needed to perform the required tasks were kept. In addition, the frequency of occurrence for each step was corrected to match the work that will be performed.

Data used to develop throughput estimates were based on consolidated shipping units (SUs) at each of the depots and come from the depot Material Release Order (MRO) History file for the week of 14-21 March 1988. To approximate SU flow through each respective freight terminal, a maximum weight per SU of 15,000 pounds at DDMT and 10,000 pounds at each of the other depots was used. SUs with weights greater than those above were considered as shipped from locations outside the freight terminal. All IPGs were included; however, subsistence, POL items, and steel articles were excluded from the analysis and selected modes were excluded at individual depots since a particular mode may not load at the freight terminal.

The respective Manning estimates include all labor and supervision directly attributed to operations occurring within the freight terminal. For areas where manpower levels remain the same (i.e., small parcel processing, high priority shipments, overseas shipments, FMS, LOGAIR, weekends, etc.) the current Manning levels provided by the depots are used to determine the total cost of operations. Ancillary functions such as GBL preparation, the challenge process, and truck drivers were not considered as part of the total cost or Manning requirements. Personnel projections are adjusted upward by 18 percent to account for leave. Various depots staff the weekend shifts differently. For this reason, some of the Manning requirements will indicate a weekend staff of zero. In these cases the weekends are covered at that depot as part of a 40 hour shift that spans the weekend days. Other depots work weekend shifts apart from their Monday through Friday shift. In our

calculations it was necessary to make this distinction in order not to double count some personnel.

Freight terminal processing is broken down into three distinct operations: (1) the flow of freight into the terminal, (2) the processing of freight within the terminal (i.e., sortation, palletization), and (3) the outloading of freight to dedicated truck, high volume points, and LTL areas.

1. Defense Depot Memphis, TN (DDMT)

a. Freight Flow Into the Terminal

LOCAL DEPOT INPUT - includes the internally generated flow of pieces and unitized freight from central pack and the outlying warehouses. Approximately 2919 pieces and 428 pallets will come from this area. All pieces will move to the sort area by conveyor system. Approximately 240 of the 428 pallets will be built in central pack and will enter the freight terminal by the towveyor system and be directed to the outload area for staging. The remaining 188 pallets will come from the outlying warehouses and will have to be moved manually onto the towveyor system for movement to the proper terminal location for outload staging. Of the 428 pallets entering the freight terminal from the local area: 12 go to air freight, 174 to dedicated truck and high volume customers, and 242 to LTL stage and outload area. All pieces will flow by conveyor into sort area.

Estimated manning requirements for locally generated freight

Transfer pallet to/from Towveyor and Direct to Proper Warehouse Location for Outloading

Standard: Freight Terminal Shipping Operations - 3340

Element A, steps 1, 2, 3, 5, 9, 10.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
1	.0167	.040	.0007
2	.1923	.020	.0038
3	.0358	.040	.0014
5	.0106	1.000	.0106
9	.0155	1.000	.0155
10	.0018	.653	.0012

TOTAL NORMAL TIME .0332  
x P.F. & D. 11.4%

STANDARD TIME .0369

$$188 \text{ pallets} \times .0369 = 10.63 / 8 = (.86) * 1.18 = 1.0 \text{ persons}^*$$

\* At DDMT pallets enter the freight terminal at more than one location and could require more than one person for this function.

b. Processing freight within the Freight Terminal

SORT AREA - is the manual sort area where it is estimated that approximately 2919 pieces will be directed daily. The pieces will be sorted to dedicated truck, high volume points, and LTL points.

Estimated manning requirements for the Manual Sort Area

Sort and Error Processing

Standard: No Current Standard Exists

<u>Step</u>	<u>Normal</u>
1. Pick up carton, verify label and documents.	.0034
2. Set aside misdirected freight.	.0001
3. Walk with carton (150 ft obstructed).	.0090
4. Set loose carton in proper hold area.	.0025
5. Return walk.	.0079
TOTAL NORMAL TIME	.0229
x P.F. & D. 27.4%	
STANDARD TIME	.0292

$$2919 \text{ pieces} \times .0292 = 85.2 / 8 = (10.6) * 1.18 = 12.6 \\ \text{Error processing} \quad \quad \quad (2.0) * 1.18 = \underline{2.4}$$

Total 14.9 persons

Approximately 134 pallets will be built in the sort area. They will consist of 104 dedicated truck and high volume customers and 30 LTL. Another 235 pallets will be needed to transfer material from the sort area to the staging area for outloading. These 235 pallets will contain approximately 5 pieces each. These are not unitized pallets, merely open pallets. It is expected that about 1177 pieces will be conveyed to outloading in this manner.

Estimated manning requirements for Palletization and Shrink/Stretch Wrap

Move material to palletization station

Standard: Freight Terminal Shipping Operations - 3340

Element A - Step 5

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
5	.0106	1.000	.0106
		TOTAL NORMAL TIME	.0106
		x P.F. & D. 11.4%	
		STANDARD TIME	.0118

584(2919/5 pcs per pallet) x .0118= 6.89/8=(.86)\*1.18 = 1.0 persons

Palletization and Stretch/Shrink Wrap Workstation

Standard: DOSO Developed Standard for Palletization

All elements, all steps.

<u>Step</u>	<u>Normal</u>
all	.0078
	TOTAL NORMAL TIME
	x P.F. & D. 11.4%
	STANDARD TIME
	.0089
2919 pieces x .0089 = 26.0 / 8 = (3.25)*1.18 = 3.8 persons Stretch/Shrink Wrap	(1.0)*1.18 = <u>1.2</u>
Total	<u>5.0</u> persons

c. Outloading freight

STAGE AND OUTLOAD FREIGHT - is for outloading freight to dedicated truck, high volume customers, and LTL customers.

Estimates for freight are:

562 pallets  
1177 pieces

Total - 1739

Estimated manning requirements for pieces/pallets outloading

Stage Material for Outloading

Standard: Freight Terminal Shipping Operations - 3340

Element B, all steps except 8, 10, 11.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
All	.1003	1.000	.1003
		TOTAL NORMAL TIME	.1003
		x P.F. & D. 11.4%	
			STANDARD TIME .1117

$$369 \text{ pallets} \times .1117 = 41.21 / 8 = (5.2) * 1.18 = \underline{6.1} \text{ persons}$$

Outloading Freight - Pieces and Pallets

Standard: Freight Terminal Shipping Operations - 3340

Element D, all steps.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
All	.0339	1.000	.0339
		TOTAL NORMAL TIME	.0339
		x P.F. & D. 11.4%	
			STANDARD TIME .0378

$$1739 \text{ pieces/pallets} \times .0378 = 65.73 / 8 = (8.2) * 1.18 = \underline{9.7} \text{ persons}$$

AIR FREIGHT - is the area used to stage and outload LOGAIR, air freight, air challenge, and FMS shipments. Current personnel levels are used in this area since operations here should not change.

Estimated manning requirements for Air Freight

Outloading Priority Freight

Standard: Current Levels are Used

Current level - 3.0 persons

SMALL PARCEL - is the area from which small parcels are shipped. Current personnel levels are used in this area since operations here should not change.

Estimated manning requirements for Small Parcels

Outloading Small Parcels - Surface and Air

Standard: Current Levels are Used

Current level = 19.0 persons

d. Total Estimated Manning Requirements for DDMT - All Areas

Where a fraction of a man is required, the number of persons needed was rounded up to the next whole number.

<u>Area</u>	<u>Persons</u>
a.	1.0
b.	22.0
c.	38.0
Weekend	20.0
Weekend - small parcels	10.0
Sub-Total	91.0
Supervisory	8.0
Weekend Supervisors	3.0
<b>TOTAL ESTIMATED PERSONS</b>	<b>102.0</b>

Additional equipment needed to handle the increased EDDS workload is as follows:

Sort area.

Six palletizing workstations @ 5625 ea.	33,750
100 ft. pallet conveyor @ 487.50/ft.	48,750
Two shrink wrap machines	31,500

**TOTAL ESTIMATED COST OF EQIP & TERM MODIFICATIONS      \$114,000**

2. Defense Depot Tracy, CA (DDTC)

a. Freight Flow Into the Terminal

LOCAL DEPOT INPUT - includes the internally generated flow of pieces and unitized freight from central pack and the outlying warehouses. Approximately 2863 pieces and 389 pallets will enter the freight terminal through this area. Loose pieces will be placed on pallets for movement within the terminal. It is estimated that at five pieces per pallet there will be about 572 pallets with loose pieces. All of these pallets will have to be moved from the intake area to either the sort area, FMS, air freight, dedicated truck/high volume customer, or LTL outloading areas.

Estimated manning requirements for locally generated freight

Transfer pallets from the Intake Area to Proper Warehouse Location for Outloading or to the Sortation Area

Standard: Freight Terminal Shipping Operations - 3340

Element A, steps 1, 2, 3, 5, 9, 11.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
1	.0167	.040	.0007
2	.1923	.020	.0038
3	.0358	.040	.0014
5	.0106	1.000	.0106
9	.0155	1.000	.0155
11	.0327	1.000	.0327

TOTAL NORMAL TIME .0647  
x P.F. & D. 11.4%

STANDARD TIME .0721

961 pallets x .0721 = 69.29 / 8 = (8.66)\*1.18 = 10.21 persons

b. Processing freight within the Freight Terminal

SORT AREA - is the manual sort area where it is estimated that approximately 2863 pieces will be directed daily. The pieces will be sorted to dedicated truck, high volume points, and LTL customers.

Estimated manning requirements for the Manual Sort Area

Sort and Error Processing

Standard: No Current Standard Exists

<u>Step</u>	<u>Normal</u>
1. Pick up carton, verify label and documents.	.0034
2. Set aside misdirected freight.	.0001
3. Walk with carton (150 ft obstructed).	.0090
4. Set loose carton in proper hold areas	.0025
5. Return walk.	.0079
TOTAL NORMAL TIME x P.F. & D. 27.4%	.0229
STANDARD TIME	.0292
2863 pieces x .0292 = 83.6 / 8 = (10.4)*1.18 = 12.3 Error processing	(1.0)*1.18 = <u>1.2</u>
Total	<u>13.5</u> persons

Approximately 168 pallets will be built in the sort area. They will consist of 145 to dedicated truck and high volume customers, and 23 to LTL customers. Another 136 pallets will be needed to transfer material from the sort area to the staging area for outloading to insect or LTL customers.

Estimated manning requirements for Palletization and Shrink/Stretch Wrap

Move material to palletization station

Standard: Freight Terminal Shipping Operations - 3340

Element A - Step 5

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
5	.0106	1.000	.0106
TOTAL NORMAL TIME x P.F. & D. 11.4%			.0106
STANDARD TIME			.0118
573(2863/5 pcs per pallet) x .0118=6.8/8-(.84)*1.18 = <u>1.0</u> persons			

Palletization and Stretch/Shrink Wrap Workstation

Standard: DOSO Developed Standard for Palletization

All elements, all steps.

<u>Step</u>	<u>Normal</u>
all	.0078
TOTAL NORMAL TIME	.0078
x P.F. & D. 11.4%	
STANDARD TIME	.0089
2863 pieces x .0089 = 25.5 / 8 = (3.2)*1.18 = 3.8 persons Stretch/Shrink Wrap	(1.0)*1.18 = <u>1.2</u>
Total	<u>5.0</u> persons

c. Outloading freight

STAGE AND OUTLOAD FREIGHT - is for outloading dedicated truck, high volume customers, and LTL freight.

Estimates for outloading insector LTL, high volume customers, and dedicated trucks.

679 pieces  
557 pallets  
  
Total - 1236

Estimated manning requirements for stage and outload freight

Stage Material for Outloading

Standard: Freight Terminal Shipping Operations - 3340

Element B, all steps except 8, 10, 11.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
All	.1003	1.000	.1003
TOTAL NORMAL TIME			.1003
x P.F. & D. 11.4%			
STANDARD TIME			.1117

304 pallets x .1117 = 34.0 / 8 = (4.2)\*1.18 = 5.0 persons

Outloading Freight - Pieces and Pallets

Standard: Freight Terminal Shipping Operations - 3340

Element D, all steps.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
All	.0339	1.000	.0339
		TOTAL NORMAL TIME	.0339
		x P.F. & D. 11.4%	
		STANDARD TIME	.0378

$$1236 \text{ pieces/pallets} \times .0378 = 46.7 / 8 = (5.8) * 1.18 = \underline{6.9} \text{ persons}$$

AIR FREIGHT - is the area used to stage and outload air freight, air challenge, and FMS shipments. Current personnel levels are used in this area since operations here should not change.

Estimated manning requirements for Air Freight

Outloading Priority Freight (Non-EDDS/FMS, OS)

Standard: Current Levels are Used

Current level = 2.0 persons

SMALL PARCEL - is the area from which small parcels are shipped. Current personnel levels are used in this area since operations here should not change.

Estimated manning requirements for Small Parcels

Outloading Small Parcels - Surface and Air

Standard: Current Levels are Used

Current level = 2.0 persons

d. Total Estimated Manning Requirements for DDTG - All Areas

Where a fraction of a man is required, the number of persons needed was rounded up to the next whole number.

<u>Area</u>	<u>Persons</u>
a.	11.0
b.	20.0
c.	16.0
Weekend	5.0
Sub-Total	52.0
Supervisory	6.0
Weekend Supervisors	1.0
TOTAL ESTIMATED PERSONS	59.0

Additional equipment needed to handle the increased EDDS workload is as follows:

Sort area.

Four palletizing workstations @ 5625 ea.	22,500
100 ft. pallet conveyor @ 487.50/ft.	48,750
One shrink wrap machines	31,500

TOTAL ESTIMATED COST OF EQIP & TERM MODIFICATIONS      \$102,750

3. Defense Depot Columbus, OH (DDCO).

a. Freight Flow Into the Terminal

LOCAL DEPOT INPUT - includes the internally generated flow of pieces and unitized freight from central pack and the outlying warehouses. Approximately 827 pieces and 162 pallets will enter the freight terminal through this area. Loose pieces will be placed on pallets for movement within the terminal. It is estimated that at five pieces per pallet there will be about 165 pallets with loose pieces. All of these pallets will have to be moved from the intake area to either the sort, FMS, air freight, dedicated truck/high volume customer, and LTL outloading areas.

Estimated manning requirements for locally generated freight

Transfer pallets from the Intake Area to Proper Warehouse  
Location for Outloading or to the Sortation Area

Standard: Freight Terminal Shipping Operations - 3340

Element A, steps 1, 2, 3, 5, 9, 10.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
1	.0167	.040	.0007
2	.1923	.020	.0038
3	.0358	.040	.0014
5	.0106	1.000	.0106
9	.0155	1.000	.0155
10	.0018	1.000	.0018

TOTAL NORMAL TIME .0380  
x P.F. & D. 11.4%

STANDARD TIME .0423

327 pallets x .0423 = 13.83 / 8 = (1.73)\*1.18 = 2.1 persons

b. Processing freight within the Freight Terminal

SORT AREA - is the manual sort area where it is estimated that approximately 827 pieces will be directed daily. The pieces will be sorted to dedicated truck, high volume points, LTL.

Estimated manning requirements for the Manual Sort Area

Sort and Error Processing

Standard: No Current Standard Exists

<u>Step</u>	<u>Normal</u>
1. Pick up carton, verify label and documents.	.0034
2. Set aside misdirected freight.	.0001
3. Walk with carton (150 ft obstructed).	.0090
4. Set loose carton in proper hold area.	.0025
5. Return walk.	.0079
TOTAL NORMAL TIME	.0229
x P.F. & D. 27.4%	
STANDARD TIME	.0292

$$827 \text{ pieces} \times .0292 = 24.1 / 8 = (3.0) * 1.18 = 3.6 \\ \text{Error processing} \quad (.5) * 1.18 = .6$$

Total 4.2 persons

Approximately 33 pallets will be built in the sort area. They will consist of 21 dedicated truck and high volume customers, and 12 LTL. Another 80 pallets will be needed to transfer material from the sort area to the staging area for outloading to insector LTL customers.

Estimated manning requirements for Palletization and Shrink/Stretch Wrap

Move material to palletization station

Standard: Freight Terminal Shipping Operations - 3340

Element A - Step 5

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
5	.0106	1.000	.0106
TOTAL NORMAL TIME			.0106
x P.F. & D. 11.4%			
STANDARD TIME			.0118

$$165(827/5 \text{ pcs per pallet}) \times .0118 = 1.95/8 = (.24) * 1.18 = .28 \text{ persons}$$

Palletization and Stretch/Shrink Wrap Workstation

Standard: DOSO Developed Standard for Palletization

All elements, all steps.

<u>Step</u>	<u>Normal</u>
all	.0078
TOTAL NORMAL TIME	.0078
x P.F. & D. 11.4%	
STANDARD TIME	.0089
827 pieces x .0089 = 7.4 / 8 = (.92)*1.18 = 1.1 persons Stretch/Shrink Wrap	( .5)*1.18 = <u>.6</u>
Total	<u>1.7</u> persons

c. Outloading freight

STAGE AND OUTLOAD FREIGHT - is for outloading dedicated truck, high volume customers, and LTL freight.

Estimates for outloading insect or LTL, high volume customers, and dedicated trucks.

398 pieces  
195 pallets

Total - 593

Estimated manning requirements for pieces/pallets outloading

Stage Material for Outloading

Standard: Freight Terminal Shipping Operations - 3340

Element B, all steps except 8, 10, 11.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
All	.1003	1.000	.1003
TOTAL NORMAL TIME			.1003
x P.F. & D. 11.4%			
STANDARD TIME			.1117

113 pallets x .1117 = 12.62 / 8 = (1.6)\*1.18 = 1.9 persons

Outloading Freight - Pieces and Pallets

Standard: Freight Terminal Shipping Operations - 3340

Element D, all steps.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
All	.0339	1.000	.0339
		TOTAL NORMAL TIME	.0339
		x P.F. & D. 11.4%	
		STANDARD TIME	.0378

593 pieces/pallets x .0378 = 22.41 / 8 = (2.8)\*1.18 = 3.3 persons

AIR FREIGHT - is the area used to stage and outload air freight, air challenge, and FMS shipments. Current personnel levels are used in this area since operations here should not change.

Estimated manning requirements for Air Freight

Outloading Priority Freight (Non-EDDS/FMS, OS)

Standard: Current Levels are Used

Current level = 4.0 persons

SMALL PARCEL - is the area from which small parcels are shipped. Current personnel levels are used in this area since operations here should not change.

Estimated manning requirements for Small Parcels

Outloading Small Parcels - Surface and Air

Standard: Current Levels are Used

Current level = 0.0 persons

d. Total Estimated Manning Requirements for DDCO - All Areas

Where a fraction of a man is required, the number of persons needed was rounded up to the next whole number.

<u>Area</u>	<u>Persons</u>
a.	3.0
b.	7.0
c.	10.0
Weekend	12.0
Sub-Total	32.0
Supervisory	3.0
Weekend Supervisors	2.0
<b>TOTAL ESTIMATED PERSONS</b>	<b>37.0</b>

Additional equipment needed to handle the increased EDDS workload is as follows:

Sort area.

Four palletizing workstations @ 5625 ea.	22,500
100 ft. pallet conveyor @ 487.50/ft.	48,750
One shrink wrap machines	15,750
<b>TOTAL ESTIMATED COST OF EQIP &amp; TERM MODIFICATIONS</b>	<b>\$87,000</b>

4. Defense Depot Ogden, UT (DDOU)

a. Freight Flow Into the Terminal

LOCAL DEPOT INPUT - includes input to the freight terminal consisting of pieces and unitized freight from central pack and the outlying warehouses. Approximately 934 pieces and 158 pallets will enter the freight terminal through this area. Loose pieces will be placed on pallets for movement within the terminal. It is estimated that at five pieces per pallet there will be about 186 pallets with loose pieces. All of these pallets will be moved from the intake area to either the sort area, FMS, air freight, dedicated truck/high volume customer, or LTL outloading areas. Pieces will move by belt conveyor while pallets will move via existing AGV system.

Estimated manning requirements for locally generated freight

Transfer pallets from the Intake Area to Proper Warehouse Location for Outloading or to the Sortation Area

Standard: None

Personnel will be available to insure a smooth flow into the system.

$$(1.5)*1.18 = \underline{1.7} \text{ persons}$$

b. Processing freight within the Freight Terminal

SORT AREA - is the manual sort area where it is estimated that approximately 934 pieces will be directed daily. The pieces will be sorted to dedicated truck, high volume points, and LTL customers.

Estimated manning requirements for the Manual Sort Area

Sort and Error Processing

Standard: No Current Standard Exists

<u>Step</u>	<u>Normal</u>
1. Pick up carton, verify label and documents.	.0034
2. Set aside misdirected freight.	.0001
3. Walk with carton (150 ft obstructed).	.0090
4. Set loose carton in proper hold area.	.0025
5. Return walk.	.0079
TOTAL NORMAL TIME	.0229
x P.F. & D. 27.4%	
STANDARD TIME	.0292
934 pieces x .0292 = 27.3 / 8 = (3.4)*1.18 = 4.0 Error processing	(.5)*1.18 = <u>.6</u>
Total	<u>4.6</u> persons

Approximately 32 pallets will be built in the sort area. They will consist of 18 to LTL and 14 to dedicated truck and high volume customers. Another 104 pallets will be needed to transfer material from the sort area to the staging area for outloading to insector LTL customers.

Estimated manning requirements for Palletization and Shrink/Stretch Wrap

Move material to palletization station

Standard: Freight Terminal Shipping Operations - 3340

Element A - Step 5

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
5	.0106	1.000	.0106
		TOTAL NORMAL TIME	.0106
		x P.F. & D. 11.4%	
		STANDARD TIME	.0118

187(934/5 pcs per pallet) x .0118=2.2/8=(.28)\*1.18 = .33 persons

Palletization and Stretch/Shrink Wrap Workstation

Standard: DOSO Developed Standard for Palletization

All elements, all steps.

<u>Step</u>	<u>Normal</u>
all	.0078
	TOTAL NORMAL TIME .0078
	x P.F. & D. 11.4%
	STANDARD TIME .0087
934 pieces x .0089 = 8.31 / 8 = (1.0)*1.18 = 1.2 persons Stretch/Shrink Wrap	(.5)*1.18 = <u>.6</u>
Total	<u>1.8</u> persons

c. Outloading freight

STAGE AND OUTLOAD FREIGHT - is for outloading dedicated truck, high volume customers, and LTL freight.

Estimates for outloading insect or LTL, high volume customers, and dedicated trucks.

518 pieces  
190 pallets

Total - 708

Estimated manning requirements for pieces/pallets outloading

Stage Material for Outloading

Standard: Freight Terminal Shipping Operations - 3340

Element B, all steps except 8, 10, 11.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
All	.1003	1.000	.1003
		TOTAL NORMAL TIME	.1003
		x P.F. & D. 11.4%	
		STANDARD TIME	.1117

$$136 \text{ pallets} \times .1117 = 15.2 / 8 = (1.9) * 1.18 = \underline{2.2} \text{ persons}$$

Outloading Freight - Pieces and Pallets

Standard: Freight Terminal Shipping Operations - 3340

Element D, all steps.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
All	.0339	1.000	.0339
		TOTAL NORMAL TIME	.0339
		x P.F. & D. 11.4%	
		STANDARD TIME	.0378

$$708 \text{ pieces/pallets} \times .0378 = 26.76 / 8 = (3.3) * 1.18 = \underline{3.9} \text{ persons}$$

AIR FREIGHT - is the area used to stage and outload air freight, air challenge, and FMS shipments. Current personnel levels are used in this area since operations here should not change.

Estimated manning requirements for Air Freight

Outloading Priority Freight (Non-EDDS/FMS, OS)

Standard: Current Levels are Used

Current level = 4.0 persons

SMALL PARCEL - is the area from which small parcels are shipped. Current personnel levels are used in this area since operations here should not change.

Estimated manning requirements for Small Parcels

Outloading Small Parcels - Surface and Air

Standard: Current Levels are Used

Current level = 4.0 persons

d. Total Estimated Manning Requirements for DDOU - All Areas

Where a fraction of a man is required, the number of persons needed was rounded up to the next whole number.

<u>Area</u>	<u>Persons</u>
a.	2.0
b.	7.0
c.	14.0
Weekend	0.0
Sub-Total	23.0
Supervisory	3.0
Weekend Supervisors	0.0
<b>TOTAL ESTIMATED PERSONS</b>	<b>26.0</b>

Additional equipment needed to handle the increased EDDS workload is as follows:

Sort area.

Four palletizing workstations @ 5625 ea.	22,500
One shrink wrap machine	15,750

<b>TOTAL ESTIMATED COST OF EQIP &amp; TERM MODIFICATIONS</b>	<b>\$ 38,250</b>
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5. Defense Depot Richmond, VA (DDRV)

a. Freight Flow Into the Terminal

LOCAL DEPOT INPUT - includes the internally generated flow of pieces and unitized freight from central pack and the outlying warehouses. Approximately 2397 pieces and 293 pallets will enter the freight terminal through this area. Loose pieces will be placed on pallets for movement within the terminal. It is estimated that at five pieces per pallet there will be about 479 pallets with loose pieces. All of these pallets will have to be moved from the intake area to either the sort area, FMS, air freight, dedicated truck/high volume customer, or LTL outloading areas.

Estimated manning requirements for locally generated freight

Transfer pallets from the Intake Area to Proper Warehouse  
Location for Outloading or to the Sortation Area

Standard: Freight Terminal Shipping Operations - 3340

Element A, steps 1, 2, 3, 5, 9, 11.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
1	.0167	.040	.0007
2	.1923	.020	.0038
3	.0358	.040	.0014
5	.0106	1.000	.0106
9	.0155	1.000	.0155
11	.0018	1.000	.0018

TOTAL NORMAL TIME .0380  
x P.F. & D. 11.4%

STANDARD TIME .0423

$$772 \text{ pallets} \times .0423 = 32.66 / 8 = (4.08) * 1.18 = \underline{4.8 \text{ persons}}$$

b. Processing freight within the Freight Terminal

SORT AREA - is the manual sort area where it is estimated that approximately 2397 pieces will be directed daily. The pieces will be sorted to dedicated truck, high volume points, and LTL customers.

Estimated manning requirements for the Manual Sort Area

Sort and Error Processing

Standard: No Current Standard Exists

<u>Step</u>	<u>Normal</u>
1. Pick up carton, verify label and documents.	.0034
2. Set aside misdirected freight.	.0001
3. Walk with carton (150 ft obstructed).	.0090
4. Set loose carton in proper hold area.	.0025
5. Return walk.	.0079
TOTAL NORMAL TIME	.0229
x P.F. & D. 27.4%	
STANDARD TIME	.0292
2397 pieces x .0292 = 70.0 / 8 = (8.7)*1.18 = 10.3 Error processing	(1.0)*1.18 = <u>1.2</u>
Total	<u>11.5</u> persons

Approximately 108 pallets will be built in the sort area. They will consist of 21 to LTL, and 87 to dedicated truck and high volume customers. Another 199 pallets will be needed to transfer material from the sort area to the staging area for outloading to insector LTL customers.

Estimated manning requirements for Palletization and Shrink/Stretch Wrap

Move material to palletization station

Standard: Freight Terminal Shipping Operations - 3340

Element A - Step 5

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
5	.0106	1.000	.0106
TOTAL NORMAL TIME			.0106
x P.F. & D. 11.4%			
STANDARD TIME			.0118

497(2397/5 pcs per pallet) x .0118= 5.7 /8-(.73)\*1.18 = .87 persons

Palletization and Stretch/Shrink Wrap Workstation

Standard: DOSO Developed Standard for Palletization

All elements, all steps.

<u>Step</u>	<u>Normal</u>
all	.0078
TOTAL NORMAL TIME	.0078
x P.F. & D. 11.4%	
STANDARD TIME	.0089
2397 pieces x .0089 = 21.33 / 8 = (2.7)*1.18 = 3.1 persons Stretch/Shrink Wrap	(1.0)*1.18 = <u>1.2</u>
Total	<u>4.3</u> persons

c. Outloading freight

STAGE AND OUTLOAD FREIGHT - is for outloading dedicated truck, high volume customers, and LTL freight.

Estimates for outloading insector LTL, high volume customers, and dedicated trucks.

993 pieces  
108 pallets

Total - 1101

Estimated manning requirements for pieces/pallets outloading

Stage Material for Outloading

Standard: Freight Terminal Shipping Operations - 3340

Element B, all steps except 8, 10, 11.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
All	.1003	1.000	.1003
TOTAL NORMAL TIME			.1003
x P.F. & D. 11.4%			
STANDARD TIME			.1117
307 pallets x .1117 = 34.3 / 8 = (4.3)*1.18 = <u>5.1</u> persons			

Outloading Freight - Pieces and Pallets

Standard: Freight Terminal Shipping Operations - 3340

Element D, all steps.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
All	.0339	1.000	.0339
	TOTAL NORMAL TIME		.0339
	x P.F. & D. 11.4%		
	STANDARD TIME		.0378

$$1101 \text{ pieces/pallets} \times .0378 = 41.6 / 8 = (5.2) * 1.18 = \underline{6.1} \text{ persons}$$

AIR FREIGHT - is the area used to stage and outload air freight, air challenge, and FMS shipments. Current personnel levels are used in this area since operations here should not change.

Estimated manning requirements for Air Freight

Outloading Priority Freight (Non-EDDS/FMS, OS)

Standard: Current Levels are Used

Current level = 4.0 persons

SMALL PARCEL - is the area from which small parcels are shipped. Current personnel levels are used in this area since operations here should not change.

Estimated manning requirements for Small Parcels

Outloading Small Parcels -Surface and Air

Standard: Current Levels are Used

Current level = 0.0 persons

d. Total Estimated Manning Requirements for DDRV - All Areas

Where a fraction of a man is required, the number of persons needed was rounded up to the next whole number.

<u>Area</u>	<u>Persons</u>
a.	5.0
b.	17.0
c.	16.0
Weekend	17.0
Sub-Total	55.0
Supervisory	5.0
Weekend Supervisors	1.0
<b>TOTAL ESTIMATED PERSONS</b>	<b>61.0</b>

Additional equipment needed to handle the increased EDDS workload is as follows:

Sort area.

Four palletizing workstations @ 5625 ea.	22,500
100 ft. pallet conveyor @ 487.50/ft.	48,750
Two shrink wrap machines	31,500

**TOTAL ESTIMATED COST OF EQIP & TERM MODIFICATIONS \$102,750**

6. Defense Depot Mechanicsburg, PA (DDMP)

a. Freight Flow Into the Terminal

LOCAL DEPOT INPUT - includes the internally generated flow of pieces and unitized freight from central pack and the outlying warehouses. Approximately 2578 pieces and 325 pallets will enter the freight terminal through this area. Loose pieces will be placed on pallets for movement within the terminal. It is estimated that at five pieces per pallet there will be about 516 pallets with loose pieces. All of these pallets will have to be moved from the intake area to either the sort area, CCP, FMS, air freight, dedicated truck/high volume customer, or LTL outloading areas.

Estimated manning requirements for locally generated freight

Transfer pallets from the Intake Area to Proper Warehouse  
Location for Outloading or to the Sortation Area

Standard: Freight Terminal Shipping Operations - 3340

Element A, steps 1, 2, 3, 5, 9, 11.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
1	.0167	.040	.0007
2	.1923	.020	.0038
3	.0358	.040	.0014
5	.0106	1.000	.0106
9	.0155	1.000	.0155
11	.0327	1.000	.0327

TOTAL NORMAL TIME .0647  
x P.F. & D. 11.4%

STANDARD TIME .0721

841 pallets x .0721 = 60.64 / 8 = (7.6)\*1.18 = 9.0 persons

VENDOR, TRANSSHIPMENT, AND DIRECT VENDOR DELIVERY RECEIVING - is the receiving area for MEDALOC, DODDS, and CCP material. It is estimated that 133 MEDALOC, 168 DODDS, and 200 CCP pieces will be received in this area. The material will have to be unloaded and data collected from each carton.

Estimated manning requirements for receiving transshipment material

Unload Commercial Carrier Having a Mixture of Pallets and Individual Containers - Vendor and Transshipment

Standard: Central Receiving (LTL)-Bin - 3221

Element A, Prepare Carrier for Unloading, all steps.

Element B, Receive Container, steps 1, 2, 3, 5, 7, 8, 9, 10, 18, 33.

Step	Base	Freq	Normal
Element A, All	.0997	.0039	.0004
Element B, 1	.0016	.004	.0001
2	.0006	.002	.0001
5	.0006	.004	.0001
7	.0378	.004	.0001
8	.0076	1.050	.0080
9	.0022	.050	.0001
10	.0031	1.000	.0031
11	.0025	.550	.0014
18	.0039	.004	.0001
33	.0288	.190	.0055
TOTAL NORMAL TIME			.0190
x P.F. & D. 11.4%			
STANDARD TIME			.0212

$$501 \text{ pieces/pallets} \times .0212 = 10.62 / 8 = (1.3) * 1.18 = \underline{1.6} \text{ persons}$$

Data Collection Workstation - MEDALOC AND DODDS

Standard: DOSO Developed - Mechanized

$$301 \times .0136 = 4.0 / 8 = (0.5) * 1.18 = \underline{.6} \text{ persons}$$

b. Processing freight within the Freight Terminal

SORT AREA - is the manual sort area where it is estimated that approximately 3079 pieces will be directed daily. They will be sorted as follows: 2176 pieces will go to dedicated truck, high volume customers, and LTL locations; 133 pieces will go to MEDALOC; 168 pieces to DODDS; and 602 to CCP. MEDALOC freight will be built into 463L pallets and shipped daily. Approximately 125 pallets will be built in the sort area at the palletization workstations. They are broken down as follows: 93 dedicated truck, high volume customers, 29 LTL, and 3 463L MEDALOC. About 272 pallets containing loose pieces will also be built in the sort area for movement to the LTL, MEDALOC, DODDS, and CCP outload areas.

Estimated manning requirements for the Manual Sort Area

Sort and Error Processing

Standard: No Current Standard Exists

<u>Step</u>	<u>Normal</u>
1. Pick up carton, verify label and documents.	.0034
2. Set aside misdirected freight.	.0001
3. Walk with carton (150 ft obstructed).	.0090
4. Set loose carton in proper hold area.	.0025
5. Return walk.	.0079
TOTAL NORMAL TIME	.0229
x P.F. & D. 27.4%	
STANDARD TIME	.0292

$$3079 \text{ pieces} \times .0292 = 89.9 / 8 = (11.23) * 1.18 = 13.3 \\ \text{Error processing} \quad (1.0) * 1.18 = 1.2$$

Total 14.5 persons

Approximately 125 pallets will be built in the sort area. They will consist of 93 dedicated truck and volume customers, 29 LTL and 3 463L Medaloc. Another 272 pallets will be needed to transfer material from the sort area to the staging area for outloading to insector LTL customers.

Estimated manning requirements for Palletization and Shrink/Stretch Wrap

Move material to palletization station

Standard: Freight Terminal Shipping Operations - 3340

Element A - Step 5

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
5	.0106	1.000	.0106
TOTAL NORMAL TIME			.0106
x P.F. & D. 11.4%			
STANDARD TIME			.0118

$$616(3072/5 \text{ pcs per pallet}) \times .0118 = 7.3/8 - (.91) * 1.18 = 1.1 \text{ persons}$$

Palletization and Stretch/Shrink Wrap Workstation

Standard: DOSO Developed Standard for Palletization

All elements, all steps.

<u>Step</u>	<u>Normal</u>
all	.0078
TOTAL NORMAL TIME	.0078
x P.F. & D. 11.4%	
STANDARD TIME	.0087
3097 pieces x .0089 = 27.40 / 8 = (3.4)*1.18 = 4.0 persons Stretch/Shrink Wrap	(1.0)*1.18 = <u>1.2</u>
Total	<u>5.2</u> persons

c. Outloading freight

STAGE AND OUTLOAD FREIGHT - is for outloading dedicated truck, high volume customers, and LTL freight.

Estimates for outloading insector LTL, high volume customers, dedicated trucks, MEDALOC, DODDS, and CCP.

1360 pieces  
450 pallets  
  
Total - 1810

Estimated manning requirements for stage and outloading freight

Stage Material for Outloading

Standard: Freight Terminal Shipping Operations - 3340

Element B, all steps except 8, 10, 11.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
All	.1003	1.000	.1003
TOTAL NORMAL TIME			.1003
x P.F. & D. 11.4%			
STANDARD TIME	.1117		
397 pallets x .1117 = 44.34 / 8 = (5.5)*1.18 = <u>6.5</u> persons			

Outloading Freight - Pieces and Pallets

Standard: Freight Terminal Shipping Operations - 3340

Element D, all steps.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
All	.0339	1.000	.0339
		TOTAL NORMAL TIME	.0339
		x P.F. & D. 11.4%	
			STANDARD TIME .0378

1810 pieces/pallets x .0378 = 68.4 / 8 = (8.6)\*1.18 = 10.1 persons

AIR FREIGHT - is the area used to stage and outload air freight, air challenge, and FMS shipments. Current personnel levels are used in this area since operations here should not change.

Estimated manning requirements for Air Freight

Outloading Priority Freight (Non-EDDS/FMS, OS)

Standard: Current Levels are Used

Current level = 4.0 persons

SMALL PARCEL - is the area from which small parcels are shipped. Current personnel levels are used in this area since operations here should not change.

Estimated manning requirements for Small Parcels

Outloading Small Parcels - Surface and Air

Standard: Current Levels are Used

Current level = 0.0 persons

d. Total Estimated Manning Requirements for DDMP - All Areas

Where a fraction of a man is required, the number of persons needed was rounded up to the next whole number.

<u>Area</u>	<u>Persons</u>
a.	12.0
b.	21.0
c.	21.0
Weekend	0.0
Sub-Total	54.0
Supervisory	7.0
Weekend Supervisors	0.0
<b>TOTAL ESTIMATED PERSONS</b>	<b>61.0</b>

Additional equipment needed to handle the increased EDDS workload is as follows:

a. Receiving area.

Extendible package conveyor	\$22,500
One package processing stations	2,025

b. Sort area.

Six palletizing workstations @ 5625 ea.	33,750
One data collection stations	6,075
100 ft. pallet conveyor @ 487.50/ft.	48,750
Two shrink wrap machines	31,500

**TOTAL ESTIMATED COST OF EQIP & TERM MODIFICATIONS      \$114,200**

## APPENDIX B

### Methodology For Manning Mechanized Freight Terminal

#### Under Unitization - Internal Workload Only

Manning requirements were developed for each freight terminal under the unitization concept. The EDDS design for each depot was used as a baseline to estimate the level of mechanization needed to accomplish unitization. From the basic EDDS design, certain equipment was eliminated based on the reduced throughput. This was done by first calculating the internal workload apart from EDDS. Using the internal workload, an analysis was performed to break out the busiest customers by piece count per week. This information was then used to establish the number of sorter lines. If a single customer had a piece count that was sufficient to keep a sorter line busy full time then a sorter line was dedicated to that customer. If a single customer only kept a sorter line busy for the equivalent of one eight hour shift per week, then that sorter line was considered as one that would be rotated on a day to day basis among different customers. In this way the total number of sorter lines required could be determined. If the original EDDS design called for more sort lines than were calculated, then the cost of the excess lines was eliminated from the cost of the EDDS equipment. Also eliminated was the cost of EDDS specific equipment such as the outbound pallet conveyors used to stage freight destined for the other EDDS sites. All of these various component costs were eliminated as well as miscellaneous items associated with equipment such as mezzanine floor space. When the new configuration was established, it was reviewed by a DOSO project engineer to insure that the validity of the design had not been compromised. This was then used as the basis for the cost of mechanization under unitization. At each depot, the same basic functions occur; however, there is some variance due to the different design configurations. Engineered standards were used to determine manpower needs by area based on the throughput and work performed within the area. For work that will be new to the freight terminal (i.e., the building of pallets) standards were developed by the Depot Operations Support Office (DOSO). For work that is currently done in the depot, standards developed by the DLA Performance Standards Support Office (DPSSO) were applied. Where the DPSSO developed standards were used, the steps to perform the work were reviewed and only those steps needed to perform the required tasks were kept. In addition, the frequency of occurrence for each step was corrected to match the work that will be performed. The DOSO developed standards were used with no additions or deletions.

Data used to develop throughput estimates were based on consolidated shipping units (SUs) at each of the depots and come from the depot Material Release Order (MRO) History file for the week of 14-21 March 1988. To approximate SU flow through each respective freight terminal, a maximum weight per SU of 15,000 pounds at DDMT and 10,000 pounds at each of the other depots was used. SUs with weights greater than those above were considered as shipped from locations outside the freight terminal. All IPGs were included; however, subsistence, POL items, and steel articles were excluded from the analysis and selected modes were excluded at individual depots since a particular mode may not load at the freight terminal.

The respective Manning estimates include all labor and supervision directly attributed to operations occurring within the freight terminal. For areas where manpower levels remain the same (i.e., small parcel processing, high priority shipments, overseas shipments, FMS, LOGAIR, weekends, etc.) the current Manning levels provided by the depots are used to determine the total cost of operations. Ancillary functions such as GBL preparation, the challenge process, and truck drivers were not considered as part of the total cost or Manning requirements. Personnel projections are adjusted upward by 18 percent to account for leave. Various depots staff the weekend shifts differently. For this reason, some of the Manning requirements will indicate a weekend staff of zero. In these cases the weekends are covered at that depot as part of a 40 hour shift that spans the weekend days. Other depots work weekend shifts apart from their Monday through Friday shift. In our calculations it was necessary to make this distinction in order not to double count some personnel.

1. Defense Depot Memphis, TN (DDMT)

a. DDMT is broken down into three areas for costing and Manning purposes, they are the freight terminal input area, the sort and unitization area, and the stage and outload area. Flows from central pack and the outlying warehouses constitute DDMT's internally generated freight flow into the system.

FREIGHT TERMINAL INPUT AREA - is the intake area for the internally generated flow of pieces and unitized freight from central pack and the outlying warehouses. Approximately 2919 pieces and 428 pallets will come from this area. Pieces will move onto the automated system by carton conveyor. Approximately 240 of the 428 pallets will be built in central pack and will enter the freight terminal by the towveyor system. The remaining 188 pallets will come from the outlying warehouses and will have to be moved manually onto the towveyor or pallet conveyor. Based on these estimates, approximately 188 pallets will be handled manually in this area. Of the 428 pallets entering the area; 12 go to air freight, 174 to dedicated truck and high volume customers, and 242 to the LTL stage and outload area. All pieces will flow through the sorter area.

Estimated manning requirements for Input Area

Transfer pallet to/from Towveyer and Direct to Proper Warehouse Location for Outloading

Standard: Freight Terminal Shipping Operations - 3340

Element A, steps 1, 2, 3, 5, 9, 10.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
1	.0167	.040	.0007
2	.1923	.020	.0038
3	.0358	.040	.0014
5	.0106	1.000	.0106
9	.0155	1.000	.0155
10	.0018	.653	.0012
TOTAL NORMAL TIME			.0332
x P.F. & D. 11.4%			
STANDARD TIME			.0369

$$188 \text{ pallets} \times .0369 = 6.93 / 8 = (.87) * 1.18 = \underline{1.0} \text{ persons}$$

SORT AND UNITIZE AREA - is the carton sorter area. It is estimated that approximately 2919 pieces will be directed through the sorter. Pallets built by the sorter at the palletization workstations are estimated as follows: 30 LTL and 104 dedicated truck and high volume customers. An additional 235 pallets will be needed to move pieces that will not be unitized to the LTL stage and outload area.

Estimated manning requirements for Carton Sorter

Sorter, Shrink Wrap, and Error Processing

Standard: DOSO Developed - Mechanized

$$2919 \text{ pieces} \times .0089 = 26.0 / 8 = (3.25) * 1.18 = 3.8$$

$$\text{Shrink wrap } 1.0 * 1.18 = 1.2$$

$$\text{Error process } 1.0 * 1.18 = \underline{1.2}$$

6.2 persons

STAGE AND OUTLOAD AREA - is for working full pallets from the pallet conveyor to DDMT LTL areas, dedicated truck and high volume customer staging areas. Approximately 369 pallets will have to be staged after leaving the sort area prior to shipment.

Estimates for outloading LTL, dedicated truck, and high volume customer freight are as follows:

562 pallets  
1177 pieces

Total - 1739

Estimated manning requirements for Staging and Outloading Freight

Staging Material for Outloading

Standard: Freight Terminal Shipping Operations - 3340

Element B, all steps except 8, 10, 11.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
All	.1003	1.000	.1003
	TOTAL NORMAL TIME		.1003
	x P.F. & D. 11.4%		
	STANDARD TIME		.1117

369 pallets x .1117 = 41.21 / 8 = (5.2)\*1.18 = 6.1 persons

Outloading Freight - Pieces and Pallets

Standard: Freight Terminal Shipping Operations - 3340

Element D, all steps.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
All	.0339	1.000	.0339
	TOTAL NORMAL TIME		.0339
	x P.F. & D. 11.4%		
	STANDARD TIME		.0378

1739 pieces/pallets x .0378 = 65.73 / 8 = (8.2)\*1.18 = 9.7 persons

PRIORITY FREIGHT - is the area used to stage and outload LOGAIR, air freight, air challenge, and FMS shipments. Current personnel levels are used in this area since operations here should not change.

Estimated manning requirements for Priority Freight

Outloading Priority Freight (Non-EDDS/FMS, OS)

Standard: Current Levels are Used

Current level = 3.0 persons

MALL PARCELS - is the area from which small parcels are shipped. Current personnel levels are used in this area since operations here should not change.

Estimated manning requirements for Small Parcel Area

Outloading Small Parcels - Surface and Air

Standard: Current Levels are Used

Current level = 19.0 persons

b. Total Estimated Manning Requirements for DDMT - All Areas

Where a fraction of a man is required, the number of persons needed was rounded up to the next whole number.

<u>Area</u>	<u>Persons</u>
Intake Area	1.0
Sort and Unitize	7.0
Stage and Outload	16.0
Priority Freight	3.0
Small Parcels	19.0
Weekend	20.0
Weekend - small parcels	10.0
Sub-Total	76.0
Supervisory	7.0
Weekend Supervisors	3.0
<b>TOTAL ESTIMATED PERSONS</b>	<b>86.0</b>

2. Defense Depot Tracy, CA (DDTC)

a. DDTC is broken down into three major areas for costing and manning purposes, they are the freight terminal input area, the sort and unitization area, and the stage and outload area. Flows from central pack and the outlying warehouses constitute DDTC's internally generated freight flow into the system.

FREIGHT TERMINAL INPUT AREA - includes the internally generated flow of pieces and unitized freight from central pack and the outlying warehouses. Approximately 2863 pieces and 389 pallets will come from this area. All pieces will move onto the automated system by carton conveyor. The pallets will be unitized in central pack and the outlying warehouses and will enter the freight terminal by transporter or pallet conveyor. Loose pieces will be on pallets for movement within the freight terminal. It is estimated that the loose pieces will represent some 572 pallets with an average five pieces per pallet.

Estimated manning requirements for the Input Area

Insure Flow of Pallets onto Conveyer System

Standard: None

$$961 \text{ pallets} = 1.0 \text{ person}$$

SORT AND UNITIZATION AREA - is the carton sorter. It is estimated that approximately 2863 pieces will be directed through the sorter. All 2863 pieces will be sorted to dedicated truck, high volume, and LTL locations. Pallets built by the sorter at the palletization workstations are estimated as follows: 145 dedicated truck, high volume customers, and 23 LTL. Approximately 136 pallets containing loose pieces will also be built in the sort area for movement to the LTL outload area.

Estimated manning requirements for Carton sorter

Sorter, Shrink Wrap, Error Processing, Verification Workstation

Standard: DOSO Developed - Mechanized

$$\begin{array}{lll} 2863 \text{ pieces} \times .0089 = 25.5 & / 8 = 3.18 & * 1.18 = 3.8 \\ \text{Stretch/shrink wrap} & & (1.0) * 1.18 = 1.2 \\ \text{Error processing} & & (.02) * 1.18 = .02 \end{array}$$

$$\text{Total} \qquad \qquad \qquad 5.0 \text{ persons}$$

STAGE AND OUTLOAD AREA - is for outloading LTL, high volume customers, and dedicated trucks.

Estimates for outloading insector LTL, high volume customers, and dedicated trucks.

679 pieces  
557 pallets

Total - 1236

### Estimated manning requirements for Stage and Outload Area

## Staging Material for Outloading

Standard: Freight Terminal Shipping Operations - 3340

Element B, all steps except 8, 10, 11.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
All	.1003	1.000	.1003
	TOTAL NORMAL TIME		.1003
	x P.F. & D. 11.4%		
	STANDARD TIME		1117

$$304 \text{ pallets} \times .1117 = 34.0 / 8 = (4.2) * 1.18 = 5.0 \text{ persons}$$

## Outloading Freight - Pieces and Pallets

Standard: Freight Terminal Shipping Operations - 3340

#### Element D. all steps.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
A11	.0339	1.000	.0339
		TOTAL NORMAL TIME	.0339
		x P.F. & D. 11.4%	
		STANDARD TIME	.0378
ieces/pallets x .0378 = 46.7 / 8 = (5.8)*1.18 = 6.9			
		Total	6.9 persons

PRIORITY FREIGHT - is the area used to stage and outload air freight, air challenge, and FMS shipments. Current personnel levels are used in this area since operations here should not change.

### Estimated manning requirements for Priority Freight Area

### **Outloading Priority Freight (Non-EDDS/FMS. OS)**

Standard: Current Levels are Used

Current level = 2.0 persons

SMALL PARCEL AREA - is the area from which small parcels are shipped. Current personnel levels are used in this area since operations here should not change.

Estimated manning requirements for Small Parcel Area

Outloading Small Parcels - Surface and Air

Standard: Current Levels are Used

Current level = 2.0 persons

b. Total Estimated Manning Requirements for DDTC - All Areas

Where a fraction of a man is required, the number of persons needed was rounded up to the next whole number.

<u>Area</u>	<u>Persons</u>
Input Area	1.0
Sort and Unitize	5.0
Stage and Outload	12.0
Priority Freight	2.0
Small Parcels	2.0
Weekend	5.0
Sub-Total	27.0
Supervisory	3.0
Weekend Supervisors	1.0
<b>TOTAL ESTIMATED PERSONS</b>	<b>31.0</b>

3. Defense Depot Columbus, OH (DDCO)

a. DDCO is broken down into three areas for costing and manning purposes, they are the freight terminal input area, the sort and unitization area, and the stage and outload area. Flows from central pack and the outlying warehouses constitute DDCO's internally generated freight flow into the system.

FREIGHT TERMINAL INPUT AREA - includes the internally generated flow of pieces and unitized freight from central pack and the outlying warehouses. Approximately 827 pieces and 162 pallets will come from this area. It is estimated that the loose pieces will represent some 165 pallets with an average five pieces per pallet. Loose pieces will move into the freight terminal via the towveyor system or will be transferred to a roller conveyor by intradepot transporter. Pieces will then be transferred to the carton conveyor manually at a depalletization station. Full pallets will move onto the pallet conveyor system either from the towveyor system or the intradepot transporter.

Estimated manning requirements for Freight Terminal Input Area

Depalletize Intradepot Material

Standard: Central Receiving (LTL)-Bulk - 3202

Element C, Unloading pallet, steps 2, 6, 13.

Step	Base	Freq	Normal
2	.0028	1.000	.0028
6	.0131	1.000	.0131
13	.0041	5.000	.0205
TOTAL NORMAL TIME			.0364
x P.F. & D. 11.4%			
STANDARD TIME			.0405

$$165 \text{ pallets} \times .0405 = 6.68 / 8 = (.83) * 1.18 = .99 \text{ persons}$$

SORT AND UNITIZATION AREA - is the carton sorter. It is estimated that approximately 827 pieces will be directed through the sorter. All 827 pieces will be sorted to dedicated truck, high volume customer, and LTL locations. Pallets built by the sorter at the palletization workstations are estimated as follows: 21 dedicated truck and high volume customers, and 12 LTL. Approximately 80 pallets containing loose pieces will also be built in the sort area for movement to the LTL outload area.

Estimated manning requirements for Carton sorter

Sorter, Shrink Wrap, Error Processing, Verification Workstation

Standard: DOSO Developed - Mechanized

$$\begin{aligned} 827 \text{ pieces} \times .0089 &= 7.4 / 8 = (.92) * 1.18 = 1.1 \\ \text{Stretch/shrink wrap} &\quad (1.0) * 1.18 = 1.2 \\ \text{Error processing} &\quad (.03) * 1.18 = .04 \end{aligned}$$

$$\text{Total} \quad \underline{2.3} \text{ persons}$$

STAGE AND OUTLOAD AREA - is for outloading dedicated truck, high volume customer, and LTL freight.

Estimates for outloading LTL, high volume customers, and dedicated trucks.

398 pieces  
195 pallets

Total - 593

Estimated manning requirements for Staging and Outloading Freight

Staging Material for Outloading

Standard: Freight Terminal Shipping Operations - 3340

Element B, all steps except 8, 10, 11.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
All	.1003	1.000	.1003
		TOTAL NORMAL TIME	.1003
		x P.F. & D. 11.4%	
		STANDARD TIME	.1117

$$113 \text{ pallets} \times .1117 = 12.6 / 8 = (1.6) * 1.18 = \underline{1.9} \text{ persons}$$

Outload Depot Freight

Standard: Freight Terminal Shipping Operations - 3340

Element D, all steps.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
All	.0339	1.000	.0339
		TOTAL NORMAL TIME	.0339
		x P.F. & D. 11.4%	
		STANDARD TIME	.0378

593 pieces/pallets  $\times .0378 = 22.41 / 8 = (2.8) * 1.18 = \underline{3.3}$

Total 3.3 persons

PRIORITY FREIGHT - is the area used to stage and outload air freight, air challenge, and FMS shipments. Current personnel levels are used in this area since operations here should not change.

Estimated manning requirements for Priority Freight Area

Outloading Priority Freight (Non-EDDS/FMS, OS)

Standard: Current Levels are Used

Current level = 4.0 persons

SMALL PARCELS - is the area from which small parcels are shipped. Current personnel levels are used in this area since operations here should not change.

Estimated manning requirements for Small Parcel Area

Outloading Small Parcels - Surface and Air

Standard: Current Levels are Used

Current level = 0.0 persons

b. Total Estimated Manning Requirements for DDCO - All Areas

Where a fraction of a man is required, the number of persons needed was rounded up to the next whole number.

<u>Area</u>	<u>Persons</u>
Input Area	1.0
Sort and Unitization	3.0
Stage and Outload	6.0
Priority Freight	4.0
Small Parcel	0.0
Weekend	12.0
Sub-Total	26.0
Supervisory	2.0
Weekend Supervisors	2.0
<b>TOTAL ESTIMATED PERSONS</b>	<b>30.0</b>

4. Defense Depot Ogden, UT (DDOU)

a. DDOU is broken down into three areas for costing and manning purposes, they are the freight terminal input area, the sort and unitization area, and the stage and outload area. Flows from central pack and the outlying warehouses constitute DDOU's internally generated freight flow into the system.

FREIGHT TERMINAL INPUT AREA - includes the internally generated flow of pieces and unitized freight from central pack and the outlying warehouses. Approximately 934 pieces and 158 pallets will come from this area. Loose pieces will move into the freight terminal via carton conveyor and will go directly to the sorter. Full pallets will move onto the pallet conveyor system by AGV system.

Estimated manning requirements for Areas 1a and 1b

Insure Flow of Materiel into the Freight Terminal

Standard: None

344 pallets - .5 persons

SORT AND UNITIZATION AREA - is the carton sorter area. It is estimated that approximately 934 pieces will be directed through the sorter. Pallets built by the sorter at the palletization workstations are estimated as follows: 14 dedicated truck and high volume customers, and 18 LTL. Approximately 104 pallets containing loose pieces will also be built in the sort area for movement to the LTL outload area.

Estimated manning requirements Sort and Unitization

Sorter, Shrink Wrap, and Error Processing

Standard: DOSO Developed - Mechanized

934 pieces x .0089 = 8.31 / 8 = (1.03)*1.18 = 1.2	
Stretch/shrink wrap	( .5)*1.18 = .6
Error processing	(.02)*1.18 = .02

Total                   1.8 persons

STAGE AND OUTLOAD AREA - is for staging and outloading freight to dedicated truck, high volume customers, and LTL areas.

Estimates for outloading insector LTL, high volume customers, and dedicated trucks.

518 pieces  
190 pallets

Total - 708

Estimates for manning the Stage and Outload Area

Staging Material for Outloading

Standard: Freight Terminal Shipping Operations - 3340

Element B, all steps except 8, 10, 11.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
All	.1003	1.000	.1003
		TOTAL NORMAL TIME	.1003
		x P.F. & D. 11.4%	
		STANDARD TIME	.1117

$$136 \text{ pallets} \times .1117 = 15.2 / 8 = (1.9) * 1.18 = \underline{2.2} \text{ persons}$$

Outloading Freight - Pieces and Pallets

Standard: Freight Terminal Shipping Operations - 3340

Element D, all steps.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
All	.0339	1.000	.0339
		TOTAL NORMAL TIME	.0339
		x P.F. & D. 11.4%	
		STANDARD TIME	.0378

$$708 \text{ pieces/pallets} \times .0378 = 26.76 / 8 = (3.3) * 1.18 = \underline{3.9} \text{ persons}$$

PRIORITY FREIGHT - is the area used to stage and outload air freight, air challenge, and FMS shipments. Current personnel levels are used in this area since operations here should not change.

Estimated manning requirements for Priority Freight

Outloading Priority Freight (Non-EDDS/FMS, QS)

Standard: Current Levels are Used

Current level = 4.0 persons

SMALL PARCELS - is the area from which small parcels are shipped. Current personnel levels are used in this area since operations here should not change.

Estimated manning requirements for Small Parcels

Outloading Small Parcels - Surface and Air

Standard: Current Levels are Used

Current level = 4.0 persons

b. Total Estimated Manning Requirements for DDOU - All Areas

Where a fraction of a man is required, the number of persons needed was rounded up to the next whole number.

<u>Area</u>	<u>Persons</u>
Intake Area	1.0
Sort and Unitize	2.0
Stage and Outload	7.0
Priority Freight	4.0
Small Parcels	4.0
Weekend	0.0
Sub-Total	18.0
Supervisory	3.0
Weekend Supervisors	0.0
TOTAL ESTIMATED PERSONS	21.0

5. Defense Depot Richmond, VA (DDRV)

a. DDRV is broken down into three areas for costing and manning purposes, they are the input area, the sort and unitization area, and the stage and outload area. Flows from central pack and the outlying warehouses constitute DDRV's internally generated freight flow into the system.

FREIGHT TERMINAL INPUT AREA - includes the internally generated flow of pieces and unitized freight from central pack and the outlying warehouses. Approximately 2397 pieces and 293 pallets will come from this area. Loose pieces will move into the freight terminal on pallets via pallet conveyor or AGV system and will have to be depalletized prior to going to the sorter. It is estimated that at five pieces per pallet the number of pallets with loose pieces will be 479. Full pallets will move onto the pallet conveyor system by AGV system.

Estimated manning requirements for Input Area

Depalletize Intradepot Shipment Material

Standard: Central Receiving (LTL)-Bulk - 3202

Element C, Unloading pallet, steps 2, 6, 13.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
2	.0028	1.000	.0028
6	.0131	1.000	.0131
13	.0041	5.000	.0205
TOTAL NORMAL TIME			.0364
x P.F. & D. 11.4%			
STANDARD TIME			.0405

479 pallets x .0405 = 19.40 / 8 = (2.42)\*1.18 = 2.9 persons

SORT AND UNITIZATION AREA - is the carton sorter area. It is estimated that approximately 2397 pieces will be directed through the sorter. Pallets built by the sorter at the palletization workstations are estimated as follows: 87 dedicated truck and high volume customers, and 21 LTL. Approximately 199 pallets containing loose pieces will also be built in the sort area for movement to the LTL outload area.

Estimated manning requirements for Sort and Unitization Area

Sorter, Shrink Wrap, and Error Processing

Standard: DOSO Developed - Mechanized

2397 pieces x .0089 = 21.33 / 8 = (2.7)\*1.18 = 3.1  
Stretch/shrink wrap (1.0)\*1.18 = 1.2  
Error processing (.03)\*1.18 = .03

Total 4.3 persons

STAGE AND OUTLOAD AREA - is for staging and outloading dedicated truck, high volume customers, and LTL freight.

Estimates for outloading insector LTL, high volume customers, and dedicated trucks.

993 pieces  
108 pallets

Total - 1101

Estimated manning requirements for Stage and Outload Area

Staging Material for Outloading

Standard: Freight Terminal Shipping Operations - 3340

Element B, all steps except 8, 10, 11.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
All	.1003	1.000	.1003
		TOTAL NORMAL TIME	.1003
		x P.F. & D. 11.4%	
		STANDARD TIME	.1117

307 pallets x .1117 = 34.3 / 8 = (4.3)\*1.18 = 5.1 persons

Outloading Freight - Pieces and Pallets

Standard: Freight Terminal Shipping Operations - 3340

Element D, all steps.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
All	.0339	1.000	.0339
		TOTAL NORMAL TIME	.0339
		x P.F. & D. 11.4%	
		STANDARD TIME	.0378

1101 pieces/pallets x .0378 = 41.6 / 8 = (5.2)\*1.18 = 6.1

Total 6.1 persons

PRIORITY FREIGHT - is the area used to stage and outload air freight, air challenge, and FMS shipments. Current personnel levels are used in this area since operations here should not change.

Estimated manning requirements for Priority Freight Area

Outloading Priority Freight (Non-EDDS/FMS, OS)

Standard: Current Levels are Used

Current level = 4.0 persons

SMALL PARCELS - is the area from which small parcels are shipped. Current personnel levels are used in this area since operations here should not change.

Estimated manning requirements for Small Parcels

Outloading Small Parcels - Surface and Air

Standard: Current Levels are Used

Current level - 0.0 persons

b. Total Estimated Manning Requirements for DDRV - All Areas

Where a fraction of a man is required, the number of persons needed was rounded up to the next whole number.

<u>Area</u>	<u>Persons</u>
Input Area	3.0
Sort and Unitize	5.0
Stage and Outload	12.0
Priority Freight	4.0
Small Parcels	0.0
Weekend	9.0
Sub-Total	33.0
Supervisory	2.0
Weekend Supervisors	1.0
<b>TOTAL ESTIMATED PERSONS</b>	<b>36.0</b>

6. Defense Depot Mechanicsburg, PA (DDMP)

a. DDMP is broken down into four areas for costing and manning purposes, they are the freight terminal input area, transshipment receiving area, the sort and unitization area, and the stage and outload area. Flows from central pack and the outlying warehouses constitute DDMP's internally generated freight flow into the system. DDMP has additional missions for MEDALOC, DODDS, and CCP.

FREIGHT TERMINAL INPUT AREA - includes the internally generated flow of pieces and unitized freight from central pack and the outlying warehouses. Approximately 2578 pieces and 325 pallets will come from this area. Both pallets and loose pieces will move into the freight terminal on pallets via transporter with the loose pieces requiring depalletization prior to moving across the sorter. It is estimated that at five pieces per pallets the number of pallets with loose pieces will be 516. Full pallets will move onto the pallet conveyor system and continue on to the outloading area.

Estimated manning requirements for Input Area

Depalletize Intradepot Shipment Material

Standard: Central Receiving (LTL)-Bulk - 3202

Element C, Unloading pallet, steps 2, 6, 13.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
2	.0028	1.000	.0028
6	.0131	1.000	.0131
13	.0041	5.000	.0205
TOTAL NORMAL TIME			.0364
x P.F. & D. 11.4%			
STANDARD TIME			.0405

$$516 \text{ pallets} \times .0405 = 20.89 / 8 = (2.61) * 1.18 = \underline{3.1} \text{ persons}$$

RECEIVING AREA - is the receiving area for MEDALOC and DODDS transshipments. Approximately 133 MEDALOC, 168 DODDS and 200 CCP pieces will be received. The material will have to be unloaded and data collected from each carton.

Estimated manning requirements for Receiving Material

Unload Commercial Carrier Having a Mixture of Pallets and Individual Containers

Standard: Central Receiving (LTL)-Bin - 3221

Element A, Prepare Carrier for Unloading, all steps.

Element B, Receive Container, steps 1, 2, 3, 5, 7, 8, 9, 10, 18, 33, 35.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
Element A, All	.0997	.0039	.0004
Element B, 1	.0016	.004	.0001
2	.0006	.002	.0001
5	.0006	.004	.0001
7	.0378	.004	.0001
8	.0076	1.050	.0080
9	.0022	.050	.0001
10	.0031	1.000	.0031
18	.0039	.004	.0001
33	.0288	.080	.0023
35	.0174	.080	.0014
TOTAL NORMAL TIME			.0155
x P.F. & D. 11.4%			
STANDARD TIME			.0173

$$501 \text{ pieces/pallets} \times .0173 = 8.7 / 8 = (1.1) * 1.18 = \underline{1.3} \text{ persons}$$

Data Collection Workstation - MEDALOC and DODDS

Standard: DOSO Developed - Mechanized

$$301 \text{ pieces} \times .0136 = 4.1 / 8 = (.5) * 1.18 = \underline{.6} \text{ persons}$$

SORT AND UNITIZE - is the carton sorter area. It is estimated that approximately 3079 pieces will cross the sorter daily. They will be directed as follows: 2176 pieces will be sorted to dedicated truck, high volume, and LTL locations; 133 pieces will go to the MEDALOC shoots; 168 pieces to the DODDS shoots; and 602 pieces to the CCP shoots. The material that is sent down shoots will be staged for later outloading with the exception of MEDALOC. MEDALOC freight will be built into 463L pallets and shipped daily. Approximately 122 pallets will be built by the sorter at the palletization workstations. They are broken down as follows: 93 dedicated truck, high volume customers, and 29 LTL. Approximately 118 pallets containing loose pieces will also be built in the sort area for movement to the LTL outload area.

Estimated manning requirements for Sort and Unitize Area

Sorter, Shrink Wrap, and Error Processing for Non-shoot Material

Standard: DOSO Developed - Mechanized

2176 pieces x .0089 = 19.4 / 8 =	(2.4)*1.18 = 2.9
Stretch/shrink wrap	(1.0)*1.18 = 1.2
Error processing	(.03)*1.18 = .03

Total 4.1 persons

Stage DODDS and CCP Material

Standard: Freight Terminal Shipping Operations - 3340

Element B, all steps except 8, 10, 11.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
All	.1003	1.000	.1003
		TOTAL NORMAL TIME	.1003
		x P. F. & D. 11.4%	
		STANDARD TIME	.1117

770 pieces x .1117 = 86.0 / 8 = (10.8)\*1.18 = 12.7 persons

Build 463L pallets for MEDALOC Material

Standard: DOSO Developed Standard for Palletization

All elements, all steps.

<u>Step</u>	<u>Normal</u>
all	.0078
	TOTAL NORMAL TIME .0078
	x P. F. & D. 11.4%
	STANDARD TIME .0089

133 pieces x .0089 = 1.18 / 8 = (.14)\*1.18 = .2 persons

STAGE AND OUTLOAD AREA - for outloading dedicated truck, high volume customers, LTL, MEDALOC, DODDS, and CCP.

Estimates for outloading, high volume customers, dedicated trucks, MEDALOC, DODDS, and CCP.

1360 pieces  
447 pallets  
3 463L pallets

Total - 1810

Estimated manning requirements for Stage and Outload Area

Staging Material for Outloading

Standard: Freight Terminal Shipping Operations - 3340

Element B, all steps except 8, 10, 11.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
All	.1003	1.000	.1003
		TOTAL NORMAL TIME	.1003
		x P.F. & D. 11.4%	
		STANDARD TIME	.1117

397 pallets x .1117 = 44.3 / 8 = (5.5)\*1.18 = 6.5 persons

Outloading Freight - Pieces and Pallets

Standard: Freight Terminal Shipping Operations - 3340

Element D, all steps.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
All	.0339	1.000	.0339
		TOTAL NORMAL TIME	.0339
		x P.F. & D. 11.4%	
		STANDARD TIME	.0378

1810 pieces/pallets x .0378 = 68.4 / 8 = (8.6)\*1.18 = 10.0

Total 10.0 persons

PRIORITY FREIGHT - is the area used to stage and outload air freight, air challenge, and FMS shipments. Current personnel levels are used in this area since operations here should not change.

Estimated manning requirements for Priority Freight

Outloading Priority Freight (Non-EDDS/FMS, OS)

Standard: Current Levels are Used

Current level = 4.0 persons

SMALL PARCELS - is the area from which small parcels are shipped. Current personnel levels are used in this area since operations here should not change.

Estimated manning requirements for Area 7

Outloading Small Parcels - Surface and Air

Standard: Current Levels are Used

Current level = 0.0 persons

b. Total Estimated Manning Requirements for DDMP - All Areas

Where a fraction of a man is required, the number of persons needed was rounded up to the next whole number.

<u>Area</u>	<u>Persons</u>
Input Area	4.0
Receiving Area	2.0
Sort and Unitize	17.0
Stage and Outload	17.0
Priority Freight	4.0
Small Parcels	0.0
Weekend	0.0
Sub-Total	44.0
Supervisory	6.0
Weekend Supervisors	0.0
<b>TOTAL ESTIMATED PERSONS</b>	<b>50.0</b>

## APPENDIX C

### Methodology For Manning Non-Mechanized Freight Terminal

#### Internal And EDDS Workload

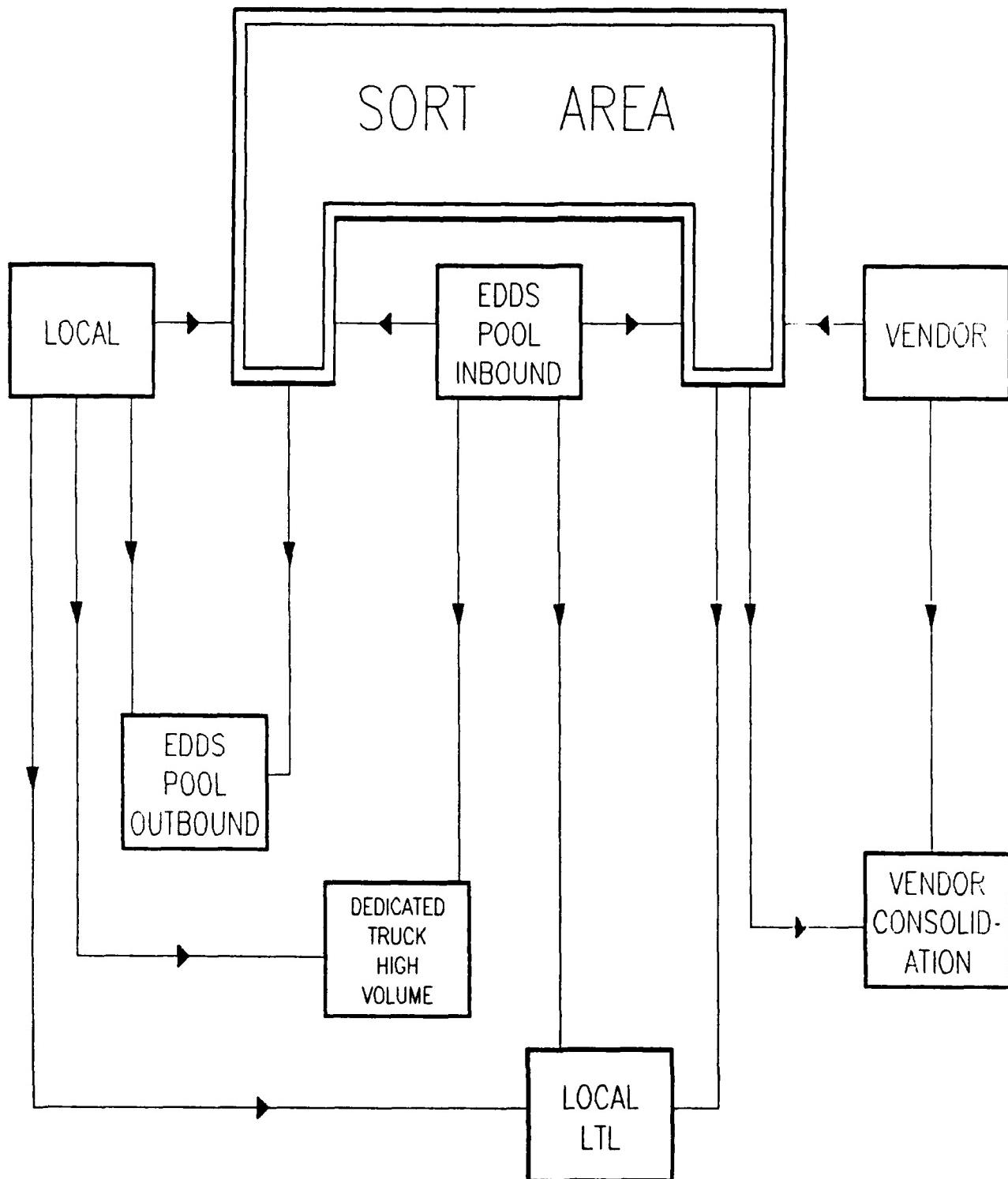
Manning requirements were developed for each freight terminal assuming the additional EDDS requirement would be accomplished manually. Since this is not currently being done at any of the freight terminals there is no schematic design to determine where the various functions will be performed. We assumed that the same basic functions will occur at each depot with only the volumes changing. In addition, we assumed that some mechanization will be installed to handle the increased volumes and palletization required under EDDS. A generic flowchart (Figure C-1) was designed which shows the flow of material through the freight terminal under the EDDS concept. Engineered standards were then used to determine manpower needs based on the throughput and work performed within a specific area. For work that will be new to the freight terminal (i.e., data collection, building of pallets, and manual sortation) either the standards developed by the Depot Operations Support Office (DOSO) for the mechanized operation or a newly developed work measurement was used. For work that is currently done in the freight terminal, standards developed by the DLA Performance Standards Support Office (DPSSO) were applied. Where the DPSSO standards are used, the steps to perform the work were reviewed and only those steps needed to perform the required tasks were kept. In addition, the frequency of occurrence for each step was corrected to match the work that will be performed.

Data used to develop throughput estimates were based on consolidated shipping units (SUs) at each of the depots and come from the depot Material Release Order (MRO) History file for the week of 14-21 March 1988. To approximate SU flow through each respective freight terminal, a maximum weight per SU of 15,000 pounds at DDMT and 10,000 pounds at each of the other depots was used. SUs with weights greater than those above were considered as shipped from locations outside the freight terminal. All IPGs were included; however, subsistence, POL items, and steel articles were excluded from the analysis and selected modes were excluded at individual depots since a particular mode may not load at the freight terminal. Estimates for vendor throughput were obtained from the Enhanced DLA Distribution System Support Office (EDDSSO).

The respective Manning estimates include all labor and supervision directly attributed to operations occurring within the freight terminal. For areas where manpower levels remain the same (i.e., small parcel processing, high priority shipments, overseas shipments, FMS, LOGAIR, weekends, etc.) the current Manning levels provided by the depots are used to determine the total cost of operations. Ancillary functions such as GBL preparation, the challenge process, and truck drivers were not considered as part of the total cost or Manning requirements. For analysis purposes, estimated personnel levels are based on pushing all the freight terminal output through one eight hour shift per day. Normal day to day operations may dictate that one or more shifts be used and that the personnel will be spread over those shifts.

Figure C-1

# EDDS FLOWCHART



Freight terminal processing is broken down into three distinct operations: (1) the flow of freight into the terminal, (2) the processing of freight within the terminal (i.e., sortation, palletization, and stage for outload), and (3) the outloading of freight to other EDDS sites, central receiving at the six DLA depots, dedicated truck and high volume points, and the insector LTL area. Personnel projections are adjusted upward by 18 percent to account for leave. Various depots staff the weekend shifts differently. For this reason, some of the man requirements will indicate a weekend staff of zero. In these cases the weekends are covered at that depot as part of a 40 hour shift that spans the weekend days. Other depots work weekend shifts apart from their Monday through Friday shift. In our calculations it was necessary to make this distinction in order not to double count some personnel. Manning requirements are estimated by depot.

1. Defense Depot Memphis, TN (DDMT)

a. Freight Flow Into the Terminal

LOCAL DEPOT INPUT - includes the internally generated flow of pieces and unitized freight from central pack and the outlying warehouses. Approximately 2919 pieces and 428 pallets will come from this area. All pieces will move to the sort area by conveyor system. Approximately 240 of the 428 pallets will be built in central pack and will enter the freight terminal by the towveyor system and be directed to the outload area for staging. The remaining 188 pallets will come from the outlying warehouses and will have to be moved manually onto the towveyor system for movement to the proper terminal location for outload staging. Of the 428 pallets entering the freight terminal from the local area: 12 go to air freight, 174 to dedicated truck and high volume customers, 73 to insector LTL, and 169 to outsector EDDS sites. All pieces will flow by conveyor into sort area, with 2335 being sorted to dedicated truck, high volume, and outsector EDDS points, and 584 pieces go to the insector LTL points.

Estimated manning requirements for locally generated freight

Transfer pallet to/from Towveyor and Direct to Proper Warehouse Location for Outloading

Standard: Freight Terminal Shipping Operations - 3340

Element A, steps 1, 2, 3, 5, 9, 10.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
1	.0167	.040	.0007
2	.1923	.020	.0038
3	.0358	.040	.0014
5	.0106	1.000	.0106
9	.0155	1.000	.0155
10	.0018	.653	.0012
TOTAL NORMAL TIME			.0332
x P.F. & D. 11.4%			
STANDARD TIME			.0369

$$188 \text{ pallets} \times .0369 = 10.63 / 8 = (.86) * 1.18 = \underline{1.0 \text{ persons}}^*$$

\* At DDMT pallets enter the freight terminal at more than one location and could require more than one person for this function.

VENDOR AND TRANSSHIPMENT RECEIVING - is the receiving area for vendor and transshipment material. It is estimated that 2359 vendor pieces will be received in this area. In addition, approximately 45 vendor and 57 transshipment pallets will be received and taken to the depalletization station where they will be stripped into 441 vendor pieces and 531 transshipment pieces. The vendor pieces will be directed through the data collection workstations while the transshipment pieces will bypass the data collection stations and go directly to the sortation area. The data collection workstation will process some 2800 pieces of vendor material per day.

Full pallets marked for a customer will either be directed down the towveyor system or taken to the outload area by forklift. Pallets that are transshipments to DDMT insector LTL, dedicated truck, and high volume customers will not need further data collection. Vendor pallets will require data collection and marking prior to moving to the staging area. Vendor pallets will number 23 while insector LTL, dedicated truck, and high volume customer pallets will be approximately 115.

Estimated manning requirements for receiving vendor and transshipment material

Unload Commercial Carrier Having a Mixture of Pallets and Individual Containers - Vendor and Transshipment

Standard: Central Receiving (LTL)-Bin - 3221

Element A, Prepare Carrier for Unloading, all steps.

Element B, Receive Container, steps 1, 2, 3, 5, 7, 8, 9, 10, 18, 33.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
Element A, All	.0997	.0039	.0004
Element B, 1	.0016	.004	.0001
2	.0006	.002	.0001
5	.0006	.004	.0001
7	.0378	.004	.0001
8	.0076	1.050	.0080
9	.0022	.050	.0001
10	.0031	1.000	.0031
18	.0039	.004	.0001
33	.0288	.080	.0023

TOTAL NORMAL TIME .0141  
x P.F. & D. 11.4%

STANDARD TIME .0157

2599 pieces/pallets x .0157 = 40.81 / 8 = (5.1)\*1.18 = 6.0 persons

Depalletize Vendor and Transshipment Material

Standard: Central Receiving (LTL)-Bulk - 3202

Element C, Unloading pallet, steps 2, 6, 13.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
2	.0028	1.000	.0028
6	.0131	1.000	.0131
13	.0041	9.529	.0390

TOTAL NORMAL TIME .0549  
x P.F. & D. 11.4%

STANDARD TIME .0612

102 pallets x .0612 = 6.24 / 8 = (.8)\*1.18 = .9 persons

Data Collection Workstation - Vendor Cartons

Standard: DOSO Developed - Mechanized

2800 pieces x .0136 = 38.08 / 8 = (4.8)\*1.18 = 5.6 persons

b. Processing freight within the Freight Terminal

SORT AREA - is the manual sort area where it is estimated that approximately 6250 pieces will be directed daily. The pieces will be sorted to dedicated truck and high volume points, other EDDS sites (outsector LTL) and insector LTL. Sources for this material are 2919 pieces from DDMT, 2800 pieces from vendors, and 531 from other EDDS sites.

Estimated manning requirements for the Manual Sort Area

Sort and Error Processing

Standard: No Current Standard Exists

<u>Step</u>	<u>Normal</u>
1. Pick up carton, verify label and documents.	.0034
2. Set aside misdirected freight.	.0001
3. Walk with carton (150 ft obstructed).	.0090
4. Set loose carton in proper hold area.	.0025
5. Return walk.	.0079
TOTAL NORMAL TIME	.0229
x P.F. & D. 27.4%	
STANDARD TIME	.0292

6250 pieces x .0292 = 182.4 / 8 = (22.8)\*1.18 = 26.9  
Error processing (4.0)\*1.18 = 4.7

Total 31.6 persons

Approximately 367 pallets will be built in the sort area. They will consist of 136 pallets of vendor material destined for central receiving at DDMT and the other DLA depots; 140 transshipments destined to other EDDS sites, and 91 dedicated truck and high volume customers. Another 204 pallets will be needed to transfer material from the sort area to the staging area for outloading to insector LTL customers. Three hundred sixty-seven pallets will have to be shrink/stretch wrapped prior to being moved to the outload area for staging.

Estimated manning requirements for Palletization and Shrink/Stretch Wrap

Move material to palletization station

Standard: Freight Terminal Shipping Operations - 3340

Element A - Step 5

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
5	.0106	1.000	.0106
TOTAL NORMAL TIME			.0106
x P.F. & D. 11.4%			
STANDARD TIME			.0118

1250(6250/5 pcs per pallet) x .0118=14.75/8=(1.8)\*1.18 = 2.1 persons

Palletization and Stretch/Shrink Wrap Workstation

Standard: DOSO Developed Standard for Palletization

All elements, all steps.

<u>Step</u>	<u>Normal</u>
all	.0078
TOTAL NORMAL TIME	.0078
x P.F. & D. 11.4%	
STANDARD TIME	.0089
6250 pieces x .0089 = 55.63 / 8 = (6.9)*1.18 = 8.2 persons Stretch/Shrink Wrap	(2.0)*1.18 = <u>2.4</u>
Total	<u>10.6</u> persons

Stage Material for Outloading

Standard: Freight Terminal Shipping Operations - 3340

Element B, all steps except 8, 10, 11.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
All	.1003	1.000	.1003
		TOTAL NORMAL TIME	.1003
		x P.F. & D. 11.4%	
		STANDARD TIME	.1117

$$571 \text{ pallets} \times .1117 = 63.78 / 8 = (7.9) * 1.18 = \underline{9.3} \text{ persons}$$

c. Outloading freight

STAGE AND OUTLOAD FREIGHT - is for outloading vendor material to DDMT central receiving, other depots central receiving, other EDDS sites, and insector LTL. Outloading DDMT central receiving will require 0 time units since pallets will be transferred to a roller-bed trailer by central receiving personnel (60 pallets).

Estimates for vendor outloading by site are:

DDMT - 60 pallets  
DDRV - 32 pallets  
DDMP - 28 pallets  
DDCO/DDOU - 12 pallets  
DDTC - 27 pallets

$$\text{Total} - (159 - 60) = 99$$

Estimates for transshipment material are:

DDRV - 27 pallets  
DDMP - 20 pallets  
DDCO - 22 pallets  
DDOU/DDTC - 27/23 - 50 pallets  
Dallas - 71 pallets  
Chicago - 32 pallets  
Jacksonville - 37 pallets  
New York/LA - 32/18 - 50 pallets

$$\text{Total} - 309$$

Estimates for insector LTL freight are:

AR, LA, MO - 206 pieces and 40 pallets  
AL, MS - 172 pieces and 34 pallets  
GA, FL - 409 pieces and 86 pallets  
TN, KY, IL - 233 pieces and 12 pallets

Total - 1020 pieces and 172 pallets

Estimates for Dedicated Truck / High Volume Customers

Total - 281 pallets

Estimated manning requirements for pieces/pallets outloading

Outloading Freight - Pieces and Pallets

Standard: Freight Terminal Shipping Operations - 3340

Element D, all steps.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
All	.0339	1.000	.0339
		TOTAL NORMAL TIME	.0339
		x P.F. & D. 11.4%	
		STANDARD TIME	.0378

1881 pieces/pallets x .0378 = 71.10 / 8 = (8.9)\*1.18 = 10.5 persons

AIR FREIGHT - is the area used to stage and outload LOGAIR, air freight, air challenge, and FMS shipments. Current personnel levels are used in this area since operations here should not change.

Estimated manning requirements for Air Freight

Outloading Priority Freight (Non-EDDS/FMS, OS)

Standard: Current Levels are Used

Current level = 3.0 persons

SMALL PARCEL - is the area from which small parcels are shipped. This area is not shown on the attached diagram. Current personnel levels are used in this area since operations here should not change.

Estimated manning requirements for Small Parcels

Outloading Small Parcels - Surface and Air

Standard: Current Levels are Used

Current level - 19.0 persons

d. Total Estimated Manning Requirements for DDMT - All Areas

Where a fraction of a man is required, the number of persons needed was rounded up to the next whole number.

<u>Area</u>	<u>Persons</u>
a.	15.0
b.	56.0
c.	33.0
Weekend	20.0
Weekend - small parcels	10.0
Sub-Total	134.0
Supervisory	15.0
Weekend Supervisors	3.0
 TOTAL ESTIMATED PERSONS	 152.0

Additional equipment needed to handle the increased EDDS workload is as follows:

a. Receiving area.

Extendible package conveyor	\$22,500
Six package processing stations	12,150
Nine transfers @ 1,725	15,525
One depalletization station	4,750
200 ft. Package conveyor @ 187/ft	37,400
40 ft. Pallet conveyor @ 487.50/ft	19,500

b. Sort area.

Five palletizing workstations @ 5625 ea.	28,125
Five data collection stations	10,125
100 ft. pallet conveyor @ 487.50/ft.	48,750
Two shrink wrap machines	63,000
One weight verification workstation	10,125
Removal of existing conveyor system	101,990
Towveyor system modification	228,000
Clean and seal floors	61,200

**TOTAL ESTIMATED COST OF EQIP & TERM MODIFICATIONS \$663,140**

2. Defense Depot Tracy, CA (DDTC).

a. Freight Flow Into the Terminal

LOCAL DEPOT INPUT - includes the internally generated flow of pieces and unitized freight from central pack and the outlying warehouses. Approximately 2863 pieces and 389 pallets will enter the freight terminal through this area. Loose pieces will be placed on pallets for movement within the terminal. It is estimated that at five pieces per pallet there will be about 572 pallets with loose pieces. All of these pallets will have to be moved from the intake area to either the sort area, FMS, air freight, dedicated truck/high volume customer, or LTL outloading areas.

Estimated manning requirements for locally generated freight

Transfer pallets from the Intake Area to Proper Warehouse Location for Outloading or to the Sortation Area

Standard: Freight Terminal Shipping Operations - 3340

Element A, steps 1, 2, 3, 5, 9, 11.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
1	.0167	.040	.0007
2	.1923	.020	.0038
3	.0358	.040	.0014
5	.0106	1.000	.0106
9	.0155	1.000	.0155
11	.0327	1.000	.0327

TOTAL NORMAL TIME .0647  
x P.F. & D. 11.4%

STANDARD TIME .0721

961 pallets x .0721 = 69.29 / 8 = (8.66)\*1.18 = 10.21 persons

VENDOR AND TRANSSHIPMENT RECEIVING - is the receiving area for vendor and transshipment material. It is estimated that 148 vendor pieces will be received in this area. In addition, approximately 12 vendor and 42 transshipment pallets will be received and taken to the depalletization station where they will be stripped into 120 vendor pieces and 476 transshipment pieces. The vendor pieces will be directed through the data collection workstations while the transshipment pieces will bypass the data collection stations and go directly to the sortation area. The data collection workstation will process some 268 pieces of vendor material per day.

Full pallets marked for a customer will be taken to the outload area by forklift. Pallets that are transshipments to DDTC insector LTL, dedicated truck, and high volume customers will need no further data collection. Vendor pallets will require data collection and marking prior to moving to the staging area. There will be approximately 1 vendor pallet and 64 pallets directed to insector LTL, dedicated truck, and high volume customers.

Estimated manning requirements for receiving vendor and transshipment material

Unload Commercial Carrier Having a Mixture of Pallets and Individual Containers - Vendor and Transshipment

Standard: Central Receiving (LTL)-Bin - 3221

Element A, Prepare Carrier for Unloading, all steps.

Element B, Receive Container, steps 1, 2, 3, 5, 7, 8, 9, 10, 18, 33.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
Element A, All	.0997	.0039	.0004
Element B, 1	.0016	.004	.0001
2	.0006	.002	.0001
5	.0006	.004	.0001
7	.0378	.004	.0002
8	.0076	1.050	.0080
9	.0022	.050	.0001
10	.0031	1.000	.0031
11	.0025	.550	.0014
18	.0039	.004	.0001
33	.0288	.190	.0055

TOTAL NORMAL TIME .0190  
x P.F. & D. 11.4%

STANDARD TIME .0212

267 pieces/pallets x .0212 = 5.66 / 8 = (.71)\*1.18 = .83 persons

Depalletize Vendor and Transshipment Material

Standard: Central Receiving (LTL)-Bulk - 3202

Element C, Unloading pallet, steps 2, 6, 13.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
2	.0028	1.000	.0028
6	.0131	1.000	.0131
13	.0041	9.529	.0390
TOTAL NORMAL TIME			.0549
x P.F. & D. 11.4%			
STANDARD TIME			.0612

$$54 \text{ pallets} \times .0612 = 3.30 / 8 = (.41) * 1.18 = .49 \text{ persons}$$

Data Collection Workstation - Vendor Cartons

Standard: DOSO Developed - Mechanized

$$268 \times .0136 = 3.64 / 8 = (.46) * 1.18 = .54 \text{ persons}$$

b. Processing freight within the Freight Terminal

SORT AREA - is the manual sort area where it is estimated that approximately 3607 pieces will be directed daily. The pieces will be sorted to dedicated truck and high volume points, other EDDS sites (outsector LTL) and insector LTL. Sources for this material are 2863 pieces from DDTC, 268 pieces from vendors, and 476 from other EDDS sites.

Estimated manning requirements for the Manual Sort Area

Sort and Error Processing

Standard: No Current Standard Exists

<u>Step</u>	<u>Normal</u>
1. Pick up carton, verify label and documents.	.0034
2. Set aside misdirected freight.	.0001
3. Walk with carton (150 ft obstructed).	.0090
4. Set loose carton in proper hold area.	.0025
5. Return walk.	.0079
TOTAL NORMAL TIME	.0229
x P.F. & D. 27.4%	
STANDARD TIME	.0292
3607 pieces x .0292 = 105.3 / 8 = (13.2)*1.18 = 15.6 Error processing	(2.0)*1.18 = <u>2.4</u>
Total	<u>18.0</u> persons

Approximately 203 pallets will be built in the sort area. They will consist of 26 pallets of vendor material destined for central receiving at DDTC and the other DLA depots; 114 transshipments destined to other EDDS sites, and 63 to LTL, dedicated truck, and high volume customers. Another 228 pallets will be needed to transfer material from the sort area to the staging area for outloading to insector LTL customers. Two hundred three pallets will have to be shrink/stretch wrapped prior to being moved to the outload area for staging.

Estimated manning requirements for Palletization and Shrink/Stretch Wrap

Move material to palletization station

Standard: Freight Terminal Shipping Operations - 3340

Element A - Step 5

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
5	.0106	1.000	.0106
TOTAL NORMAL TIME			.0106
x P.F. & D. 11.4%			
STANDARD TIME			.0118

$$721(3607/5 \text{ pcs per pallet}) \times .0118 = 8.51/8 = (1.1) * 1.18 = \underline{1.3} \text{ persons}$$

Palletization and Stretch/Shrink Wrap Workstation

Standard: DOSO Developed Standard for Palletization

All elements, all steps.

<u>Step</u>	<u>Normal</u>
all	.0078
TOTAL NORMAL TIME	.0078
x P.F. & D. 11.4%	
STANDARD TIME	.0089
3607 pieces x .0089 = 32.10 / 8 = (4.0) * 1.18 = 4.7 persons Stretch/Shrink Wrap	(1.0) * 1.18 = <u>1.2</u>
Total	<u>5.9</u> persons

Stage Material for Outloading

Standard: Freight Terminal Shipping Operations - 3340

Element B, all steps except 8, 10, 11.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
All	.1003	1.000	.1003
		TOTAL NORMAL TIME	.1003
		x P.F. & D. 11.4%	
		STANDARD TIME	.1117

$$431 \text{ pallets} \times .1117 = 48.14 / 8 = (6.0) * 1.18 = \underline{7.1} \text{ persons}$$

c. Outloading freight

STAGE AND OUTLOAD FREIGHT - is for outloading vendor material to DDT<sup>C</sup> central receiving, other depots central receiving, other EDDS sites, and insector LTL.

Estimates for outloading insector LTL, high volume customers, and dedicated trucks.

1274 pieces  
245 pallets

Total - 1519

Estimates for vendor outloading by site are:

DDMT - 6 pallets  
DDR<sup>V</sup> - 4 pallets  
DDMP - 5 pallets  
DDCO - 2 pallets  
DDOU - 3 pallets  
DDTC - 7 pallets

Total - 27

Estimates for transshipment material are:

DDRV - 28 pallets  
DDMP - 30 pallets  
DDCO - 3 pallets  
DDOU - 78 pallets  
DDMT - 25 pallets  
Dallas - 19 pallets  
Chicago - 3 pallets  
Jacksonville - 11 pallets  
New York - 3 pallets  
Los Angeles - 156 pallets

Total - 356

Estimated manning requirements for pieces/pallets outloading

Outloading Freight - Pieces and Pallets

Standard: Freight Terminal Shipping Operations - 3340

Element D, all steps.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
All	.0339	1.000	.0339
		TOTAL NORMAL TIME	.0339
		x P.F. & D. 11.4%	
		STANDARD TIME	.0378

1902 pieces/pallets x .0378 = 71.89 / 8 = (8.9)\*1.18 = 10.6 persons

AIR FREIGHT - is the area used to stage and outload air freight, air challenge, and FMS shipments. Current personnel levels are used in this area since operations here should not change.

Estimated manning requirements for Air Freight

Outloading Priority Freight (Non-EDDS/FMS, OS)

Standard: Current Levels are Used

Current level - 2.0 persons

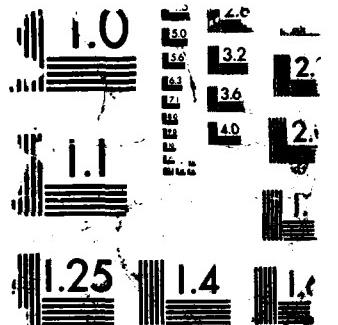
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SMALL PARCEL - is the area from which small parcels are shipped. This area is not shown on the attached diagram. Current personnel levels are used in this area since operations here should not change.

Estimated manning requirements for Small Parcels

Outloading Small Parcels - Surface and Air

Standard: Current Levels are Used

Current level = 2.0 persons

d. Total Estimated Manning Requirements for DDTG - All Areas

Where a fraction of a man is required, the number of persons needed was rounded up to the next whole number.

<u>Area</u>	<u>Persons</u>
a.	14.0
b.	34.0
c.	15.0
Weekend	5.0
Sub-Total	68.0
Supervisory	8.0
Weekend Supervisors	1.0
TOTAL ESTIMATED PERSONS	77.0

Additional equipment needed to handle the increased EDDS workload is as follows:

a. Receiving area.

Extendible package conveyor	\$22,500
Two package processing stations	4,050
Five transfers @ 1,725	8,625
One depalletization station	4,750

b. Sort area.

Four palletizing workstations @ 5625 ea.	22,500
Four data collection stations	4,050
100 ft. pallet conveyor @ 487.50/ft.	48,750
One shrink wrap machines	31,500
One weight verification workstation	10,125

TOTAL ESTIMATED COST OF EQIP & TERM MODIFICATIONS \$156,850

3. Defense Depot Columbus, OH (DDCO)

a. Freight Flow Into the Terminal

LOCAL DEPOT INPUT - includes the internally generated flow of pieces and unitized freight from central pack and the outlying warehouses. Approximately 827 pieces and 162 pallets will enter the freight terminal through this area. Loose pieces will be placed on pallets for movement within the terminal. It is estimated that at five pieces per pallet there will be about 165 pallets with loose pieces. All of these pallets will have to be moved from the intake area to either the sort, FMS, air freight, dedicated truck/high volume customer, and LTL outloading areas.

Estimated manning requirements for locally generated freight

Transfer pallets from the Intake Area to Proper Warehouse Location for Outloading or to the Sortation Area

Standard: Freight Terminal Shipping Operations - 3340

Element A, steps 1, 2, 3, 5, 9, 11.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
1	.0167	.040	.0007
2	.1923	.020	.0038
3	.0358	.040	.0014
5	.0106	1.000	.0106
9	.0155	1.000	.0155
10	.0018	1.000	.0018
TOTAL NORMAL TIME			.0380
x P.F. & D. 11.4%			
STANDARD TIME			.0423

$$327 \text{ pallets} \times .0423 = 13.83 / 8 = (1.73) * 1.18 = \underline{2.1 \text{ persons}}$$

VENDOR AND TRANSSHIPMENT RECEIVING - is the receiving area for vendor and transshipment material. It is estimated that 970 vendor pieces will be received in this area. In addition, approximately 102 vendor and 23 transshipment pallets will be received and taken to the depalletization station where they will be stripped into 1330 vendor pieces and 238 transshipment pieces. The vendor pieces will be directed through the data collection workstations while the transshipment pieces will bypass the data collection stations and go directly to the sortation area. The data collection workstation will process some 2300 pieces of vendor material per day.

Full pallets marked for a customer will be taken to the outload area by forklift. Pallets that are transshipments to DDCO insector LTL, dedicated truck, and high volume customers will need no further data collection. Vendor pallets will require data collection and marking prior to moving to the staging area. There will be approximately 23 vendor pallets and 36 pallets directed to insector LTL, dedicated truck, and high volume customers.

Estimated manning requirements for receiving vendor and transshipment material

Unload Commercial Carrier Having a Mixture of Pallets and Individual Containers - Vendor and Transshipment

Standard: Central Receiving (LTL)-Bin - 3221

Element A, Prepare Carrier for Unloading, all steps.

Element B, Receive Container, steps 1, 2, 3, 5, 7, 8, 9, 10, 18, 33.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
Element A, All	.0997	.0039	.0004
Element B, 1	.0016	.004	.0001
2	.0006	.002	.0001
5	.0006	.004	.0001
7	.0378	.004	.0001
8	.0076	1.050	.0080
9	.0022	.050	.0001
10	.0031	1.000	.0031
11	.0025	.550	.0014
18	.0039	.004	.0001
33	.0288	.190	.0055
TOTAL NORMAL TIME			.0190
x P.F. & D. 11.4%			
STANDARD TIME			.0212

1095 pieces/pallets x .0212 = 23.21 / 8 = (2.9)\*1.18 = 3.4 persons

Depalletize Vendor and Transshipment Material

Standard: Central Receiving (LTL)-Bulk - 3202

Element C, Unloading pallet, steps 2, 6, 13.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
2	.0028	1.000	.0028
6	.0131	1.000	.0131
13	.0041	9.529	.0390
TOTAL NORMAL TIME			.0549
x P.F. & D. 11.4%			
STANDARD TIME			.0612

$$125 \text{ pallets} \times .0612 = 7.65 / 8 = (.96) * 1.18 = \underline{1.1} \text{ persons}$$

Data Collection Workstation - Vendor Cartons

Standard: DOSO Developed - Mechanized

$$2300 \times .0136 = 31.28 / 8 = (3.9) * 1.18 = \underline{4.6} \text{ persons}$$

b. Processing freight within the Freight Terminal

SORT AREA - is the manual sort area where it is estimated that approximately 3365 pieces will be directed daily. The pieces will be sorted to dedicated truck and high volume points, other EDDS sites (outsector LTL) and insector LTL. Sources for this material are 827 pieces from DDCO, 2300 pieces from vendors, and 238 from other EDDS sites.

Estimated manning requirements for the Manual Sort Area

Sort and Error Processing

Standard: No Current Standard Exists

<u>Step</u>	<u>Normal</u>
1. Pick up carton, verify label and documents.	.0034
2. Set aside misdirected freight.	.0001
3. Walk with carton (150 ft obstructed).	.0090
4. Set loose carton in proper hold area.	.0025
5. Return walk.	.0079
TOTAL NORMAL TIME	.0229
x P.F. & D. 27.4%	
STANDARD TIME	.0292
3365 pieces x .0292 = 98.2 / 8 = (12.3)*1.18 = 14.5 Error processing	(2.0)*1.18 = <u>2.4</u>
Total	<u>16.9</u> persons

Approximately 294 pallets will be built in the sort area. They will consist of 203 pallets of vendor material destined for central receiving at DDCO and the other DLA depots; 79 transshipments destined to other EDDS sites, and 12 to LTL, dedicated truck, and high volume customers. Another 47 pallets will be needed to transfer material from the sort area to the staging area for outloading to insector LTL customers. Two hundred ninety-four pallets will have to be shrink/stretch wrapped prior to being moved to the outload area for staging.

Estimated manning requirements for Palletization and Shrink/Stretch Wrap

Move material to palletization station

Standard: Freight Terminal Shipping Operations - 3340

Element A - Step 5

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
5	.0106	1.000	.0106
		TOTAL NORMAL TIME	.0106
		x P.F. & D. 11.4%	
		STANDARD TIME	.0118

$$673(3365/5 \text{ pcs per pallet}) \times .0118 = 7.94/8 = (1.0) * 1.18 = \underline{1.2} \text{ persons}$$

Palletization and Stretch/Shrink Wrap Workstation

Standard: DOSO Developed Standard for Palletization

All elements, all steps.

<u>Step</u>	<u>Normal</u>
all	.0078
	TOTAL NORMAL TIME .0078
	x P.F. & D. 11.4%
	STANDARD TIME .0089
3365 pieces x .0089 = 29.98 / 8 = (3.7) * 1.18 = 4.4 persons Stretch/Shrink Wrap	(1.0) * 1.18 = <u>1.2</u>
Total	<u>5.6</u> persons

Stage Material for Outloading

Standard: Freight Terminal Shipping Operations - 3340

Element B, all steps except 8, 10, 11.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
All	.1003	1.000	.1003
		TOTAL NORMAL TIME	.1003
		x P.F. & D. 11.4%	
		STANDARD TIME	.1117

$$341 \text{ pallets} \times .1117 = 38.08 / 8 = (4.8) * 1.18 = \underline{5.6} \text{ persons}$$

c. Outloading freight

STAGE AND OUTLOAD FREIGHT - is for outloading vendor material to DDCO central receiving, other depots central receiving, other EDDS sites, and insector LTL.

Estimates for outloading insector LTL, high volume customers, and dedicated trucks.

233 pieces  
57 pallets

Total - 290

Estimates for vendor outloading by site are:

DDMT - 50 pallets  
DDRV - 16 pallets  
DDMP - 35 pallets  
DDCO - 43 pallets  
DDOU - 39 pallets  
DDTC - 43 pallets

Total - 226

Estimates for transshipment material are:

DDRV - 37 pallets  
DDMP - 64 pallets  
DDTC - 14 pallets  
DDOU - 11 pallets  
DDMT - 35 pallets  
Dallas - 9 pallets  
Chicago - 27 pallets  
Jacksonville - 7 pallets  
New York - 13 pallets  
Los Angeles - 11 pallets

Total - 228

Estimated manning requirements for pieces/pallets outloading

Outloading Freight - Pieces and Pallets

Standard: Freight Terminal Shipping Operations - 3340

Element D, all steps.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
All	.0339	1.000	.0339
		TOTAL NORMAL TIME	.0339
		x P.F. & D. 11.48	
			STANDARD TIME .0378

744 pieces/pallets x .0378 = 28.12 / 8 = (3.5)\*1.18 = 4.1 persons

AIR FREIGHT - is the area used to stage and outload air freight, air challenge, and FMS shipments. Current personnel levels are used in this area since operations here should not change.

Estimated manning requirements for Air Freight

Outloading Priority Freight (Non-EDDS/FMS, OS)

Standard: Current Levels are Used

Current level - 4.0 persons

SMALL PARCEL - is the area from which small parcels are shipped. This area is not shown on the attached diagram. Current personnel levels are used in this area since operations here should not change.

Estimated manning requirements for Small Parcels

Outloading Small Parcels - Surface and Air

Standard: Current Levels are Used

Current level = 0.0 persons

d. Total Estimated Manning Requirements for DDCO - All Areas

Where a fraction of a man is required, the number of persons needed was rounded up to the next whole number.

<u>Area</u>	<u>Persons</u>
a.	14.0
b.	31.0
c.	9.0
Weekend	12.0
Sub-Total	66.0
Supervisory	9.0
Weekend Supervisors	2.0
TOTAL ESTIMATED PERSONS	77.0

Additional equipment needed to handle the increased EDDS workload is as follows:

a. Receiving area.

Extendible package conveyor	\$22,500
Three package processing stations	6,075
Six transfers @ 1,725	10,952
One depalletization station	4,750

b. Sort area.

Four palletizing workstations @ 5625 ea.	22,500
Four data collection stations	8,100
100 ft. pallet conveyor @ 487.50/ft.	48,750
One shrink wrap machines	15,750
One weight verification workstation	10,125

**TOTAL ESTIMATED COST OF EQIP & TERM MODIFICATIONS      \$149,502**

4. Defense Depot Ogden, UT (DDOU)

a. Freight Flow Into the Terminal

LOCAL DEPOT INPUT - includes input to the freight terminal consisting of pieces and unitized freight from central pack and the outlying warehouses. Approximately 934 pieces and 158 pallets will enter the freight terminal through this area. Loose pieces will be placed on pallets for movement within the terminal. It is estimated that at five pieces per pallet there will be about 186 pallets with loose pieces. All of these pallets will be moved from the intake area to either the sort area, FMS, air freight, dedicated truck/high volume customer, or LTL outloading areas. Pieces will move by belt conveyor while pallets will move via existing AGV system.

Estimated manning requirements for locally generated freight

Transfer pallets from the Intake Area to Proper Warehouse Location for Outloading or to the Sortation Area

Standard: None

Personnel will be available to insure a smooth flow into the system.

$$(1.5)*1.18 = \underline{1.7} \text{ persons}$$

VENDOR AND TRANSSHIPMENT RECEIVING - is the receiving area for vendor and transshipment material. It is estimated that 66 vendor pieces will be received in this area. In addition, approximately 42 transshipment pallets will be received and taken to the depalletization station where they will be stripped into 427 transshipment pieces. The vendor pieces will be directed through the data collection workstation while the transshipment pieces will bypass the data collection stations and go directly to the sortation area. The data collection workstation will process some 66 pieces of vendor material per day.

Full pallets marked for a customer will be taken to the outload area by forklift. Pallets that are transshipments to DDOU insector LTL, dedicated truck, and high volume customers will need no further data collection. There will be approximately 62 pallets directed to insector LTL, dedicated truck, and high volume customers.

Estimated manning requirements for receiving vendor and transshipment material

Unload Commercial Carrier Having a Mixture of Pallets and Individual Containers - Vendor and Transshipment

Standard: Central Receiving (LTL)-Bin - 3221

Element A, Prepare Carrier for Unloading, all steps.

Element B, Receive Container, steps 1, 2, 3, 5, 7, 8, 9, 10, 18, 33.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
Element A, All	.0997	.0039	.0004
Element B, 1	.0016	.004	.0001
2	.0006	.002	.0001
5	.0006	.004	.0001
7	.0378	.004	.0001
8	.0076	1.050	.0080
9	.0022	.050	.0001
10	.0031	1.000	.0031
11	.0025	.550	.0014
18	.0039	.004	.0001
33	.0288	.190	.0055
TOTAL NORMAL TIME			.0190
x P.F. & D. 11.4%			
STANDARD TIME			.0212

170 pieces/pallets x .0212 = 3.60 / 8 = (.45)\*1.18 = .53 persons

Depalletize Vendor and Transshipment Material

Standard: Central Receiving (LTL)-Bulk - 3202

Element C, Unloading pallet, steps 2, 6, 13.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
2	.0028	1.000	.0028
6	.0131	1.000	.0131
13	.0041	9.529	.0390
TOTAL NORMAL TIME			.0549
x P.F. & D. 11.4%			
STANDARD TIME			.0612

42 pallets x .0612 = 2.57 / 8 = (.32)\*1.18 = .38 persons

Data Collection Workstation - Vendor Cartons

Standard: DOSO Developed - Mechanized

$$66 \times .0136 = .90 / 8 = (.11) * 1.18 = .13 \text{ persons}$$

b. Processing freight within the Freight Terminal

SORT AREA - is the manual sort area where it is estimated that approximately 1427 pieces will be directed daily. The pieces will be sorted to dedicated truck and high volume points, other EDDS sites (outsector LTL) and insector LTL. Sources for this material are 934 pieces from DDOU, 66 pieces from vendors, and 427 from other EDDS sites.

Estimated manning requirements for the Manual Sort Area

Sort and Error Processing

Standard: No Current Standard Exists

<u>Step</u>	<u>Normal</u>
1. Pick up carton, verify label and documents.	.0034
2. Set aside misdirected freight.	.0001
3. Walk with carton (150 ft obstructed).	.0090
4. Set loose carton in proper hold area.	.0025
5. Return walk.	.0079

TOTAL NORMAL TIME .0229  
x P.F. & D. 27.4%

STANDARD TIME .0292

$$1427 \text{ pieces} \times .0292 = 54.16 / 8 = (5.2) * 1.18 = 6.2 \\ \text{Error processing} \quad (1.0) * 1.18 = .12$$

Total 7.4 persons

Approximately 102 pallets will be built in the sort area. They will consist of 6 pallets of vendor material destined for central receiving at DDOU and the other DLA depots; 73 transshipments destined to other EDDS sites, and 23 to LTL, dedicated truck, and high volume customers. Another 91 pallets will be needed to transfer material from the sort area to the staging area for outloading to insector LTL customers. One hundred two pallets will have to be shrink/stretch wrapped prior to being moved to the outload area for staging.

Estimated manning requirements for Palletization and Shrink/Stretch Wrap

Move material to palletization station

Standard: Freight Terminal Shipping Operations - 3340

Element A - Step 5

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
5	.0106	1.000	.0106
		TOTAL NORMAL TIME	.0106
		x P.F. & D. 11.4%	
		STANDARD TIME	.0118

285(1427/5 pcs per pallet) x .0118=3.36/8=(.42)\*1.18 = .50 persons

Palletization and Stretch/Shrink Wrap Workstation

Standard: DOSO Developed Standard for Palletization

All elements, all steps.

<u>Step</u>	<u>Normal</u>
all	.0078
	TOTAL NORMAL TIME .0078
	x P.F. & D. 11.4%
	STANDARD TIME .0087
1427 pieces x .0089 = 12.7 / 8 = (1.6)*1.18 = 1.9 persons Stretch/Shrink Wrap	(1.0)*1.18 = <u>1.2</u>
Total	<u>3.1</u> persons

Stage Material for Outloading

Standard: Freight Terminal Shipping Operations - 3340

Element B, all steps except 8, 10, 11.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
All	.1003	1.000	.1003
		TOTAL NORMAL TIME	.1003
		x P.F. & D. 11.4%	
		STANDARD TIME	.1117

$$193 \text{ pallets} \times .1117 = 21.56 / 8 = (2.7) * 1.18 = \underline{3.2} \text{ persons}$$

c. Outloading freight

STAGE AND OUTLOAD FREIGHT - is for outloading vendor material to DDOU central receiving, other depots central receiving, other EDDS sites, and insector LTL.

Estimates for outloading insector LTL, high volume customers, and dedicated trucks.

456 pieces  
129 pallets

Total - 585

Estimates for vendor outloading by site are:

DDMT/DDRV/DDMP - 3 pallets  
DDCO/DDTC/DDOU - 3 pallets

Total - 6

Estimates for transshipment material are:

DDMT/DDDRV/DDMP - 42 pallets  
DDCO/DDTC/DDOU - 52 pallets  
Dallas - 47 pallets  
New York/Jacksonville/Chicago - 15 pallets  
Los Angeles - 31 pallets

Total - 187

Estimated manning requirements for pieces/pallets outloading  
Outloading Freight - Pieces and Pallets

Standard: Freight Terminal Shipping Operations - 3340

Element D, all steps.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
All	.0339	1.000	.0339
		TOTAL NORMAL TIME	.0339
		x P.F. & D. 11.4%	
		STANDARD TIME	.0378

$$778 \text{ pieces/pallets} \times .0378 = 29.41 / 8 = (3.7) * 1.18 = \underline{4.4} \text{ persons}$$

AIR FREIGHT - is the area used to stage and outload air freight, air challenge, and FMS shipments. Current personnel levels are used in this area since operations here should not change.

Estimated manning requirements for Air Freight

Outloading Priority Freight (Non-EDDS/FMS, OS)

Standard: Current Levels are Used

Current level = 4.0 persons

SMALL PARCEL - is the area from which small parcels are shipped. This area is not shown on the attached diagram. Current personnel levels are used in this area since operations here should not change.

Estimated manning requirements for Small Parcels

Outloading Small Parcels - Surface and Air

Standard: Current Levels are Used

Current level = 4.0 persons

d. Total Estimated Manning Requirements for DDOU - All Areas

Where a fraction of a man is required, the number of persons needed was rounded up to the next whole number.

<u>Area</u>	<u>Persons</u>
a.	5.0
b.	17.0
c.	13.0
Weekend	0.0
Sub-Total	35.0
Supervisory	5.0
Weekend Supervisors	0.0
TOTAL ESTIMATED PERSONS	40.0

Additional equipment needed to handle the increased EDDS workload is as follows:

a. Receiving area.

Two extendible package conveyors	\$45,000
One package processing stations	2,025
Two transfers @ 1,725	3,450
One depalletization station	4,750

b. Sort area.

Four palletizing workstations @ 5625 ea.	22,500
One data collection stations	2,025
One shrink wrap machine	15,750
One weight verification workstation	10,125

TOTAL ESTIMATED COST OF EQIP & TERM MODIFICATIONS \$ 72,950

5. Defense Depot Richmond, VA (DDRV)

a. Freight Flow Into the Terminal

LOCAL DEPOT INPUT - includes the internally generated flow of pieces and unitized freight from central pack and the outlying warehouses. Approximately 2397 pieces and 293 pallets will enter the freight terminal through this area. Loose pieces will be placed on pallets for movement within the terminal. It is estimated that at five pieces per pallet there will be about 479 pallets with loose pieces. All of these pallets will have to be moved from the intake area to either the sort area, FMS, air freight, dedicated truck/high volume customer, or LTL outloading areas.

Estimated manning requirements for locally generated freight

Transfer pallets from the Intake Area to Proper Warehouse  
Location for Outloading or to the Sortation Area

Standard: Freight Terminal Shipping Operations - 3340

Element A, steps 1, 2, 3, 5, 9, 11.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
1	.0167	.040	.0007
2	.1923	.020	.0038
3	.0358	.040	.0014
5	.0106	1.000	.0106
9	.0155	1.000	.0155
11	.0018	1.000	.0018
TOTAL NORMAL TIME			.0380
x P.F. & D. 11.4%			
STANDARD TIME			.0423

$$772 \text{ pallets} \times .0423 = 32.66 / 8 = (4.08) * 1.18 = 4.8 \text{ persons}$$

VENDOR AND TRANSSHIPMENT RECEIVING - is the receiving area for vendor and transshipment material. It is estimated that 1294 vendor pieces will be received in this area. In addition, approximately 86 vendor and 69 transshipment pallets will be received and taken to the depalletization station where they will be stripped into 863 vendor pieces and 690 transshipment pieces. The vendor pieces will be directed through the data collection workstations while the transshipment pieces will bypass the data collection stations and go directly to the sortation area. The data collection workstation will process some 2157 pieces of vendor material per day.

Full pallets marked for a customer will be taken to the outload area by forklift. Pallets that are transshipments to DDRV insector LTL, dedicated truck, and high volume customers will need no further data collection. Vendor pallets will require data collection and marking prior to moving to the staging area. There will be approximately 19 vendor pallet and 103 pallets directed to insector LTL, dedicated truck, and high volume customers.

Estimated manning requirements for receiving vendor and transshipment material

Unload Commercial Carrier Having a Mixture of Pallets and Individual Containers - Vendor and Transshipment

Standard: Central Receiving (LTL)-Bin - 3221

Element A, Prepare Carrier for Unloading, all steps.

Element B, Receive Container, steps 1, 2, 3, 5, 7, 8, 9, 10, 18, 33.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
Element A, All	.0997	.0039	.0004
Element B, 1	.0016	.004	.0001
2	.0006	.002	.0001
5	.0006	.004	.0001
7	.0378	.004	.0001
8	.0076	1.050	.0080
9	.0022	.050	.0001
10	.0031	1.000	.0031
11	.0025	.550	.0014
18	.0039	.004	.0001
33	.0288	.190	.0055
TOTAL NORMAL TIME			.0190
x P.F. & D. 11.4%			
STANDARD TIME			.0212

1571 pieces/pallets x .0212 = 33.31 / 8 = (4.16)\*1.18 = 4.9 persons

Depalletize Vendor and Transshipment Material

Standard: Central Receiving (LTL)-Bulk - 3202

Element C, Unloading pallet, steps 2, 6, 13.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
2	.0028	1.000	.0028
6	.0131	1.000	.0131
13	.0041	9.529	.0390
TOTAL NORMAL TIME			.0549
x P.F. & D. 11.4%			
STANDARD TIME			.0612

155 pallets x .0612 = 9.49 / 8 = (1.19)\*1.18 = 1.4 persons

Data Collection Workstation - Vendor Cartons

Standard: DOSO Developed - Mechanized

$$2157 \times .0136 = 29.33 / 8 = (3.7) * 1.18 = \underline{4.3} \text{ persons}$$

b. Processing freight within the Freight Terminal

SORT AREA - is the manual sort area where it is estimated that approximately 5244 pieces will be directed daily. The pieces will be sorted to dedicated truck and high volume points, other EDDS sites (outsector LTL) and insector LTL. Sources for this material are 2397 pieces from DDRV, 2157 pieces from vendors, and 690 from other EDDS sites.

Estimated manning requirements for the Manual Sort Area

Sort and Error Processing

Standard: No Current Standard Exists

<u>Step</u>	<u>Normal</u>
1. Pick up carton, verify label and documents.	.0034
2. Set aside misdirected freight.	.0001
3. Walk with carton (150 ft obstructed).	.0090
4. Set loose carton in proper hold area.	.0025
5. Return walk.	.0079

$$\begin{array}{l} \text{TOTAL NORMAL TIME} \\ \times \text{P.F. \& D. } 27.4\% \end{array} \quad .0229$$

$$\text{STANDARD TIME} \quad .0292$$

$$\begin{array}{l} 5244 \text{ pieces} \times .0292 = 153.1 / 8 = (19.1) * 1.18 = 22.6 \\ \text{Error processing} \quad (2.0) * 1.18 = \underline{2.4} \end{array}$$

$$\text{Total} \quad \underline{25.0} \text{ persons}$$

Approximately 307 pallets will be built in the sort area. They will consist of 156 pallets of vendor material destined for central receiving at DDRV and the other DLA depots; 95 transshipments destined to other EDDS sites, and 56 to LTL, dedicated truck, and high volume customers. Another 221 pallets will be needed to transfer material from the sort area to the staging area for outloading to insector LTL customers. Three hundred seven pallets will have to be shrink/stretch wrapped prior to being moved to the outload area for staging.

Estimated manning requirements for Palletization and Shrink/Stretch Wrap

Move material to palletization station

Standard: Freight Terminal Shipping Operations - 3340

Element A - Step 5

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
5	.0106	1.000	.0106
TOTAL NORMAL TIME			.0106
x P.F. & D. 11.4%			
STANDARD TIME			.0118

1049(5244/5 pcs per pallet) x .0118=12.38/8=(1.5)\*1.18 = 1.8 persons

Palletization and Stretch/Shrink Wrap Workstation

Standard: DOSO Developed Standard for Palletization

All elements, all steps.

<u>Step</u>	<u>Normal</u>
all	.0078
TOTAL NORMAL TIME .0078	
x P.F. & D. 11.4%	
STANDARD TIME .0089	
5244 pieces x .0089 = 46.67 / 8 = (5.8)*1.18 = 6.9 persons	
Stretch/Shrink Wrap (2.0)*1.18 = <u>2.3</u>	
Total	<u>9.2</u> persons

Stage Material for Outloading

Standard: Freight Terminal Shipping Operations - 3340

Element B, all steps except 8, 10, 11.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
All	.1003	1.000	.1003
		TOTAL NORMAL TIME	.1003
		x P.F. & D. 11.4%	
		STANDARD TIME	.1117

$$528 \text{ pallets} \times .1117 = 58.98 / 8 = (7.4) * 1.18 = \underline{8.7} \text{ persons}$$

c. Outloading freight

STAGE AND OUTLOAD FREIGHT - is for outloading vendor material to DDRV central receiving, other depots central receiving, other EDDS sites, and insector LTL.

Estimates for outloading insector LTL, high volume customers, and dedicated trucks.

1105 pieces  
280 pallets

Total - 1385

Estimates for vendor outloading by site are:

DDMT - 45 pallets  
DDRV - 36 pallets  
DDMP - 39 pallets  
DDCO - 3 pallets  
DDOU - 16 pallets  
DDTC - 36 pallets

Total - 175

Estimates for transshipment material are:

DDCO - 8 pallets  
DDMP - 83 pallets  
DDTC - 32 pallets  
DDOU - 9 pallets  
DDMT - 48 pallets  
Dallas - 21 pallets  
Chicago - 7 pallets  
Jacksonville - 37 pallets  
New York - 12 pallets  
Los Angeles - 10 pallets

Total - 267

Estimated manning requirements for pieces/pallets outloading

Outloading Freight - Pieces and Pallets

Standard: Freight Terminal Shipping Operations - 3340

Element D, all steps.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
All	.0339	1.000	.0339
		TOTAL NORMAL TIME	.0339
		x P.F. & D. 11.4%	
		STANDARD TIME	.0378

1827 pieces/pallets x .0378 = 69.0 / 8 = (8.6)\*1.18 = 10.2 persons

AIR FREIGHT - is the area used to stage and outload air freight, air challenge, and FMS shipments. Current personnel levels are used in this area since operations here should not change.

Estimated manning requirements for Air Freight

Outloading Priority Freight (Non-EDDS/FMS, OS)

Standard: Current Levels are Used

Current level = 4.0 persons

SMALL PARCEL - is the area from which small parcels are shipped. This area is not shown on the attached diagram. Current personnel levels are used in this area since operations here should not change.

Estimated manning requirements for Small Parcels

Outloading Small Parcels - Surface and Air

Standard: Current Levels are Used

Current level = 0.0 persons

d. Total Estimated Manning Requirements for DDRV - All Areas

Where a fraction of a man is required, the number of persons needed was rounded up to the next whole number.

<u>Area</u>	<u>Persons</u>
a.	17.0
b.	46.0
c.	15.0
Weekend	17.0
Sub-Total	95.0
Supervisory	11.0
Weekend Supervisors	1.0
<b>TOTAL ESTIMATED PERSONS</b>	<b>107.0</b>

Additional equipment needed to handle the increased EDDS workload is as follows:

a. Receiving area.

Extendible package conveyor	\$22,500
Two package processing stations	4,050
Six transfers @ 1,725	10,952
One depalletization station	4,750

b. Sort area.

Six palletizing workstations @ 5625 ea.	22,500
Five data collection stations	10,125
100 ft. pallet conveyor @ 487.50/ft.	48,750
Two shrink wrap machines	31,500
One weight verification workstation	10,125

**TOTAL ESTIMATED COST OF EQIP & TERM MODIFICATIONS      \$176,502**

## 6. Defense Depot Mechanicsburg, PA (DDMP)

### a. Freight Flow Into the Terminal

LOCAL DEPOT INPUT - includes the internally generated flow of pieces and unitized freight from central pack and the outlying warehouses. Approximately 2578 pieces and 325 pallets will enter the freight terminal through this area. Loose pieces will be placed on pallets for movement within the terminal. It is estimated that at five pieces per pallet there will be about 516 pallets with loose pieces. All of these pallets will have to be moved from the intake area to either the sort area, CCP, FMS, air freight, dedicated truck/high volume customer, or LTL outloading areas.

#### Estimated manning requirements for locally generated freight

##### Transfer pallets from the Intake Area to Proper Warehouse Location for Outloading or to the Sortation Area

Standard: Freight Terminal Shipping Operations - 3340

Element A, steps 1, 2, 3, 5, 9, 11.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
1	.0167	.040	.0007
2	.1923	.020	.0038
3	.0358	.040	.0014
5	.0106	1.000	.0106
9	.0155	1.000	.0155
10	.0018	1.000	.0018

TOTAL NORMAL TIME .0380  
x P.F. & D. 11.4%

STANDARD TIME .0423

$$841 \text{ pallets} \times .0423 = 35.57 / 8 = (4.45) * 1.18 = \underline{5.2 \text{ persons}}$$

VENDOR, TRANSSHIPMENT, AND DIRECT VENDOR DELIVERY RECEIVING - is the receiving area for vendor, transshipment, MEDALOC, DODDS, and CCP material. It is estimated that 1830 vendor, 133 MEDALOC, and 168 DODDS pieces will be received in this area. In addition, approximately 130 vendor, 45 transshipment, and 20 CCP pallets will be received and taken to the depalletization station where they will be stripped into 1830 vendor pieces, 587 transshipment pieces, and 200 CCP pieces. The vendor pieces will be directed through the data collection workstations while the transshipment pieces will bypass the data collection stations and go directly to the sortation area. The data collection workstation will process some 3961 pieces of vendor, MEDALOC, and DODDS material per day.

Full pallets marked for a customer will be taken to the outload area by forklift. Pallets that are transshipments to DDMP insector LTL, dedicated truck, high volume customers, and CCP will need no further data collection. Vendor pallets will require data collection and marking prior to moving to the staging area. There will be approximately 30 vendor pallets, 77 pallets directed to insector LTL, dedicated truck, and high volume customers, and 28 pallets going to the DDMP CCP.

Estimated manning requirements for receiving vendor and transshipment material

Unload Commercial Carrier Having a Mixture of Pallets and Individual Containers - Vendor and Transshipment

Standard: Central Receiving (LTL)-Bin - 3221

Element A, Prepare Carrier for Unloading, all steps.

Element B, Receive Container, steps 1, 2, 3, 5, 7, 8, 9, 10, 18, 33.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
Element A, All	.0997	.0039	.0004
Element B, 1	.0016	.004	.0001
2	.0006	.002	.0001
5	.0006	.004	.0001
7	.0378	.004	.0001
8	.0076	1.050	.0080
9	.0022	.050	.0001
10	.0031	1.000	.0031
11	.0025	.550	.0014
18	.0039	.004	.0001
33	.0288	.190	.0055
TOTAL NORMAL TIME			.0190
x P.F. & D. 11.4%			
STANDARD TIME			.0212

2461 pieces/pallets x .0212 = 52.17 / 8 = (6.52)\*1.18 = 7.7 persons

Depalletize Vendor and Transshipment Material

Standard: Central Receiving (LTL)-Bulk - 3202

Element C, Unloading pallet, steps 2, 6, 13.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
2	.0028	1.000	.0028
6	.0131	1.000	.0131
13	.0041	9.529	.0390
TOTAL NORMAL TIME			.0549
x P.F. & D. 11.4%			
STANDARD TIME			.0612

$$195 \text{ pallets} \times .0612 = 11.9 / 8 = (1.49) * 1.18 = \underline{1.8} \text{ persons}$$

Data Collection Workstation - Vendor Cartons

Standard: DOSO Developed - Mechanized

$$3961 \times .0136 = 53.86 / 8 = (6.7) * 1.18 = \underline{7.9} \text{ persons}$$

b. Processing freight within the Freight Terminal

SORT AREA - is the manual sort area where it is estimated that approximately 7326 pieces will be directed daily. The pieces will be sorted to dedicated truck and high volume points, other EDDS sites (outsector LTL), MEDALOC, DODDS, CCP, and insector LTL. Sources for this material are 2578 pieces from DDMP, 3660 pieces from vendors, 133 MEDALOC pieces, 168 DODDS pieces, and 787 pieces from other EDDS sites.

Estimated manning requirements for the Manual Sort Area

Sort and Error Processing

Standard: No Current Standard Exists

<u>Step</u>	<u>Normal</u>
1. Pick up carton, verify label and documents.	.0034
2. Set aside misdirected freight.	.0001
3. Walk with carton (150 ft obstructed).	.0090
4. Set loose carton in proper hold area.	.0025
5. Return walk.	.0079
TOTAL NORMAL TIME	.0229
x P.F. & D. 27.4%	

STANDARD TIME .0292

$$7326 \text{ pieces} \times .0292 = 213.9 / 8 = (26.7) * 1.18 = 31.6 \\ \text{Error processing} \quad (2.0) * 1.18 = \underline{2.4}$$

Total 34.0 persons

Approximately 450 pallets will be built in the sort area. They will consist of 269 pallets of vendor material destined for central receiving at DDMP and the other DLA depots; 127 transshipments destined to other EDDS sites, and 54 to LTL, dedicated truck, high volume customers, MEDALOC, DODDS, and CCP. Another 217 pallets will be needed to transfer material from the sort area to the staging area for outloading to insector LTL customers. Four hundred fifty pallets will have to be shrink/stretch wrapped prior to being moved to the outload area for staging.

Estimated manning requirements for Palletization and Shrink/Stretch Wrap

Move material to palletization station

Standard: Freight Terminal Shipping Operations - 3340

Element A - Step 5

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
5	.0106	1.000	.0106
		TOTAL NORMAL TIME	.0106
		x P.F. & D. 11.4%	
		STANDARD TIME	.0118

1465(7326/5 pcs per pallet) x .0118=17.29/8=(2.1)\*1.18 = 2.5 persons

Palletization and Stretch/Shrink Wrap Workstation

Standard: DOSO Developed Standard for Palletization

All elements, all steps.

<u>Step</u>	<u>Normal</u>
all	.0078
	TOTAL NORMAL TIME .0078
	x P.F. & D. 11.4%
	STANDARD TIME .0087
7326 pieces x .0089 = 65.20 / 8 = (8.2)*1.18 = 9.6 persons Stretch/Shrink Wrap	(2.0)*1.18 = <u>2.3</u>
Total	<u>11.9</u> persons

Stage Material for Outloading

Standard: Freight Terminal Shipping Operations - 3340

Element B, all steps except 8, 10, 11.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
All	.1003	1.000	.1003
		TOTAL NORMAL TIME	.1003
		x P.F. & D. 11.4%	
		STANDARD TIME	.1117

$$667 \text{ pallets} \times .1117 = 74.50 / 8 = (9.3) * 1.18 = \underline{11.0} \text{ persons}$$

c. Outloading freight

STAGE AND OUTLOAD FREIGHT - is for outloading vendor material to DDRV central receiving, other depots central receiving, other EDDS sites, and insector LTL.

Estimates for outloading insector LTL, high volume customers, dedicated trucks, MEDALOC, DODDS, and CCP.

1087 pieces  
241 pallets

Total - 1328

Estimates for vendor outloading by site are:

DDMT - 72 pallets  
DDRV - 48 pallets  
DDMP - 63 pallets  
DDCO - 21 pallets  
DDOU - 35 pallets  
DDTC - 60 pallets

Total - 299

Estimates for transshipment material are:

DDCO - 19 pallets  
DDRV - 126 pallets  
DDTC - 39 pallets  
DDOU - 13 pallets  
DDMT - 50 pallets  
Dallas - 25 pallets  
Chicago - 14 pallets  
Jacksonville - 10 pallets  
New York - 54 pallets  
Los Angeles - 20 pallets

Total - 370

Estimated manning requirements for pieces/pallets outloading

Outloading Freight - Pieces and Pallets

Standard: Freight Terminal Shipping Operations - 3340

Element D, all steps.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
All	.0339	1.000	.0339
		TOTAL NORMAL TIME	.0339
		x P.F. & D. 11.4%	
		STANDARD TIME	.0378

1997 pieces/pallets x .0378 = 75.5 / 8 = (9.4)\*1.18 = 11.1 persons

AIR FREIGHT - is the area used to stage and outload air freight, air challenge, and FMS shipments. Current personnel levels are used in this area since operations here should not change.

Estimated manning requirements for Air Freight

Outloading Priority Freight (Non-EDDS/FMS, OS)

Standard: Current Levels are Used

Current level = 4.0 persons

SMALL PARCEL - is the area from which small parcels are shipped. This area is not shown on the attached diagram. Current personnel levels are used in this area since operations here should not change.

Estimated manning requirements for Small Parcels

Outloading Small Parcels - Surface and Air

Standard: Current Levels are Used

Current level = 0.0 persons

d. Total Estimated Manning Requirements for DDMP - All Areas

Where a fraction of a man is required, the number of persons needed was rounded up to the next whole number.

<u>Area</u>	<u>Persons</u>
a.	23.0
b.	60.0
c.	16.0
Weekend	0.0
Sub-Total	99.0
Supervisory	14.0
Weekend Supervisors	0.0
<b>TOTAL ESTIMATED PERSONS</b>	<b>113.0</b>

Additional equipment needed to handle the increased EDDS workload is as follows:

a. Receiving area.

Extendible package conveyor	\$22,500
Two package processing stations	4,050
Eight transfers @ 1,725	13,800
One depalletization station	4,750

b. Sort area.

Eight palletizing workstations @ 5625 ea.	45,000
Six data collection stations	12,150
100 ft. pallet conveyor @ 487.50/ft.	48,750
Two shrink wrap machines	31,500
One weight verification workstation	10,125

**TOTAL ESTIMATED COST OF EQIP & TERM MODIFICATIONS      \$192,625**

## APPENDIX D

### Methodology For Manning Mechanized Freight Terminal

#### Internal and EDDS Workload

Manning requirements were developed for each of the mechanized freight terminal designs. To simplify the analysis, each terminal design was broken down into functional areas. At each depot, the same basic functions will occur; however, area designations vary slightly between designs because of the different design configurations. Engineered standards were used to determine manpower needs by area based on the throughput and work performed within the area. For work that will be new to the freight terminal (i.e., data collection and the building of pallets) standards were developed by the Depot Operations Support Office (DOSO). For work that is currently done in the depot, standards developed by the DLA Performance Standards Support Office (DPSSO) were applied. Where the DPSSO developed standards were used, the steps to perform the work were reviewed and only those steps needed to perform the required tasks were kept. In addition, the frequency of occurrence for each step was corrected to match the work that will be performed. The DOSO developed standards were used with no additions or deletions.

Data used to develop throughput estimates were based on consolidated shipping units (SUs) at each of the depots and come from the depot Material Release Order (MRO) History file for the week of 14-21 March 1988. To approximate SU flow through each respective freight terminal, a maximum weight per SU of 15,000 pounds at DDMT and 10,000 pounds at each of the other depots was used. SUs with weights greater than those above were considered as shipped from locations outside the freight terminal. All IPGs were included; however, subsistence, POL items, and steel articles were excluded from the analysis and selected modes were excluded at individual depots since a particular mode may not load at the freight terminal. Estimates for vendor throughput were obtained from the Enhanced DLA Distribution System Support Office (EDDSSO).

The respective Manning estimates include all labor and supervision directly attributed to operations occurring within the freight terminal. For areas where manpower levels remain the same (i.e., small parcel processing, high priority shipments, overseas shipments, FMS, LOGAIR, weekends, etc.) the current Manning levels provided by the depots are used to determine the total cost of operations. Ancillary functions such as GBL preparation, the challenge process, and truck drivers were not considered as part of the total cost or Manning requirements. For analysis purposes, estimated personnel levels are based on pushing all the freight terminal output through one eight hour shift per day. Normal day to day operations may dictate that one or more shifts be used and that the personnel will be spread over those shifts.

Each depot is broken down into areas to simplify the analysis process. Personnel projections are adjusted upward by 18 percent to account for leave. Various depots staff the weekend shifts differently. For this reason, some of the Manning requirements will indicate a weekend staff of zero. In these cases the weekends are covered at that depot as part of a 40 hour shift that spans the weekend days. Other depots work weekend shifts apart from their

Monday through Friday shift. In our calculations it was necessary to make this distinction in order not to double count some personnel. Included with each depot is a copy of the DOSO design.

1. Defense Depot Memphis, TN (DDMT)

a. DDMT is broken down into nine areas for costing and manning purposes. The DOSO design of this freight terminal is shown in Figure D-1. Flows from central pack and the outlying warehouses constitute DDMT's internally generated freight flow into the system.

Area 1 - includes the internally generated flow of pieces and unitized freight from central pack and the outlying warehouses. Approximately 2919 pieces and 428 pallets will come from this area. All pieces will move onto the automated system by carton conveyor. Approximately 240 of the 428 pallets will be built in central pack and will enter the freight terminal by the towveyor system. The remaining 188 pallets will come from the outlying warehouses and will have to be moved manually onto the towveyor or pallet conveyor. About 100 of the 240 pallets entering Area 1 from central pack and 69 of the 188 pallets from the outlying warehouses will have to be placed onto the pallet conveyor for movement to Area 4 for outloading. Based on these estimates, approximately 288 pallets will be handled manually in Area 1 (188 from outlying warehouses and 100 from central pack). Of the 428 pallets entering Area 1; 12 go to air freight, 174 to dedicated truck and high volume customers, 73 to insector LTL, and 169 to outsector EDDS sites. All pieces will flow through the sorter area, with 2335 being sorted to dedicated truck, high volume, and outsector EDDS points. Five hundred eighty-four pieces will cross the sorter and go to the insector LTL lines.

Estimated manning requirements for Area 1

Transfer pallet to/from Towveyor and Direct to Proper Warehouse Location for Outloading

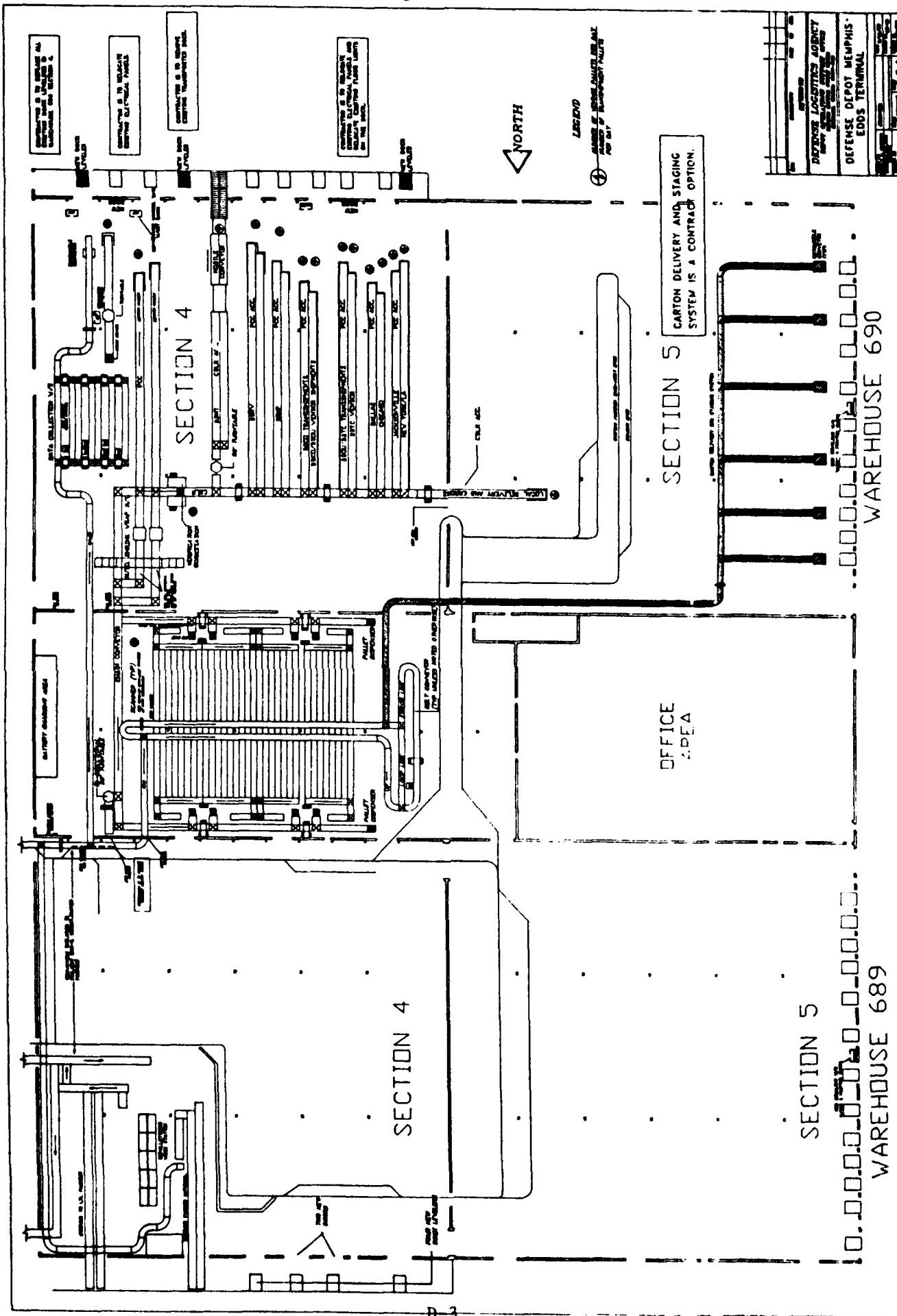
Standard: Freight Terminal Shipping Operations - 3340

Element A, steps 1, 2, 3, 5, 9, 10.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
1	.0167	.040	.0007
2	.1923	.020	.0038
3	.0358	.040	.0014
5	.0106	1.000	.0106
9	.0155	1.000	.0155
10	.0018	.653	.0012
TOTAL NORMAL TIME			.0332
x P.F. & D. 11.4%			
STANDARD TIME			.0369

$$288 \text{ pallets} \times .0369 = 10.63 / 8 = (1.3) * 1.18 = \underline{1.5} \text{ persons}$$

Figure D-1



Area 2 - is the receiving area. In this area material from vendors and DLA depot transshipments will be received. At the extendible conveyor it is estimated that 2359 pieces will be received from vendors. The depalletization station will receive 45 vendor and 57 transshipment pallets that will be stripped into 441 vendor pieces and 531 transshipment pieces. The vendor pieces will be directed through the data collection workstations while the transshipment pieces will be pre-marked and will bypass the data collection stations. The data collection workstation will process some 2800 pieces of vendor material per day.

Full pallets marked for a customer will be directed down a pallet conveyor. Pallets that are transshipments to DDMT insector LTL, dedicated truck, and high volume customers will not need further data collection. Vendor full pallets will require data collection and marking prior to moving onto the unloading conveyor. Vendor pallets will number 23 while insector LTL, dedicated truck, and high volume customer pallets will be approximately 115.

Estimated manning requirements for Area 2 - Receiving Vendor Material

Unload Commercial Carrier Having a Mixture of Pallets and Individual Containers - Vendor and Transshipment

Standard: Central Receiving (LTL)-Bin - 3221

Element A, Prepare Carrier for Unloading, all steps.

Element B, Receive Container, steps 1, 2, 3, 5, 7, 8, 9, 10, 18, 33, 35.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
Element A, All	.0997	.0039	.0004
Element B, 1	.0016	.004	.0001
2	.0006	.002	.0001
5	.0006	.004	.0001
7	.0378	.004	.0001
8	.0076	1.050	.0080
9	.0022	.050	.0001
10	.0031	1.000	.0031
18	.0039	.004	.0001
33	.0288	.080	.0023
35	.0174	.080	.0014
TOTAL NORMAL TIME			.0155
x P.F. & D. 11.4%			
STANDARD TIME			.0173

2599 pieces/pallets x .0173 = 44.96 / 8 = (5.6)\*1.18 = 6.6 persons

Depalletize Vendor and Transshipment Material

Standard: Central Receiving (LTL)-Bulk - 3202

Element C, Unloading pallet, steps 2, 6, 13.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
2	.0028	1.000	.0028
6	.0131	1.000	.0131
13	.0041	9.529	.0390
TOTAL NORMAL TIME			.0549
x P.F. & D. 11.4%			
STANDARD TIME			.0612

$$102 \text{ pallets} \times .0612 = 6.24 / 8 = (.8) * 1.18 = .9 \text{ persons}$$

Data Collection Workstation - Vendor Cartons

Standard: DOSO Developed - Mechanized

$$2800 \text{ pieces} \times .0136 = 38.08 / 8 = (4.8) * 1.18 = 5.7 \text{ persons}$$

Area 3 - is the carton sorter. It is estimated that approximately 6250 pieces will be directed through the sorter. About 5230 pieces will be sorted to dedicated truck, high volume, and other EDDS sites (outsector LTL). The insector LTL freight will travel across the sorter and continue onto the finger lines (Area 6 - 1020 pieces). Sources for this material are 2919 pieces from DDMT, 2800 pieces from vendors, and 531 from other EDDS sites.

Pallets built by the sorter at the 8 workstations are estimated as follows: 136 vendor material destined for central receiving at DDMT and the other DL<sub>A</sub> depots; 140 transshipments destined to other EDDS sites, and 91 dedicated truck and high volume customers.

Note - Pallets crossing the verification workstation in Area 3 are as follows: 367 built by sorter, 138 from vendor and transshipments, and 169 from Area 1 to other EDDS sites. Total pallets crossing the workstation is 674.

Estimated manning requirements for Area 3 - Carton sorter

Sorter, Shrink Wrap, Error Processing, Verification Workstation

Standard: DOSO Developed - Mechanized

All steps.  $(11.1) * 1.18 = 13.1 \text{ persons}$

Area 4 - is for outloading vendor material to DDMT central receiving, other depots central receiving and other EDDS sites transshipment material. Outloading DDMT central receiving will require 0 time units since pallets will be transferred to a roller-bed trailer by central receiving personnel (60 pallets).

Estimates for vendor outloading by site are:

DDMT - 60 pallets  
DDRV - 32 pallets  
DDMP - 28 pallets  
DDCO/DDOU - 12 pallets  
DDTC - 27 pallets

Total - (159 - 60) = 99

Estimates for transshipment material are:

DDRV - 27 pallets  
DDMP - 20 pallets  
DDCO - 22 pallets  
DDOU/DDTC - 27/23 = 50 pallets  
Dallas - 71 pallets  
Chicago - 32 pallets  
Jacksonville - 37 pallets  
New York/LA - 32/18 = 50 pallets

Total - 309

Estimates manning requirements for Area 4

Outloading Transshipments and Vendor Material

Standard: Freight Terminal Shipping Operations - 3340

Element D, all steps.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
All	.0339	1.000	.0339
		TOTAL NORMAL TIME	.0339
		x P.F. & D. 11.4%	

STANDARD TIME .0378

(468-60) = 408 pallets x .0378 = 15.42 / 8 = (1.9)\*1.18 = 2.2  
Error processing (1.0)\*1.18 = 1.2

Total 2.9 persons

Area 5 - is for working full pallets from the pallet conveyor to DDMT insector LTL, dedicated truck staging, and high volume customer staging area. Pallets for this area are estimated as follows: 107 dedicated truck/high volume customers (16 from other depots and 91 built by the sorter); and, 99 insector LTL (built by sorter).

Estimated manning requirements for Area 5

Staging Material for Outloading

Standard: Freight Terminal Shipping Operations - 3340

Element B, all steps except 8, 10, 11.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
All	.1003	1.000	.1003
	TOTAL NORMAL TIME		.1003
	x P.F. & D. 11.4%		
	STANDARD TIME		.1117

$$206 \text{ pallets} \times .1117 = 23.01 / 8 = (2.9) * 1.18 = \underline{3.4} \text{ persons}$$

Area 6 - is the insector LTL staging and outload area. Outloading from this area will involve a mixture of both pallets and pieces. The total is 1020 pieces and 172 pallets, broken down as follows:

AR, LA, MO - 206 pieces/40 pallets  
AL, MS - 172 pieces/34 pallets  
GA, FL - 409 pieces/86 pallets  
TN, KY, IL - 233 pieces/12 pallets

Total - 1020 pieces / 172 pallets

Estimated manning requirements for Area 6

Outloading Insector LTL - Pieces and Pallets

Standard: Freight Terminal Shipping Operations - 3340

Element D, all steps.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
All	.0339	1.000	.0339
		TOTAL NORMAL TIME	.0339
		x P.F. & D. 11.4%	
		STANDARD TIME	.0378

$$1192 \text{ pieces/pallets} \times .0378 = 45.06 / 8 = (5.6) * 1.18 = \underline{6.6} \text{ persons}$$

Area 7 - is the outloading area for high volume customers. It is assumed that dedicated truck outloading will be done either in this area or in section 6 of warehouse 690. Both dedicated truck and high volume customers are considered together for manning purposes. Volume in this area is estimated to be 281 pallets. One hundred seventy-four from Area 1, 91 built by sorter, and 16 from other depots.

Estimated manning requirements for Area 7

Outloading Dedicated Truck and High Volume Customers

Standard: Freight Terminal Shipping Operations - 3340

All elements, all steps.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
All	.1704	1.000	.1704
		TOTAL NORMAL TIME	.1704
		x P.F. & D. 11.4%	
		STANDARD TIME	.1898

$$281 \text{ pallets} \times .1898 = 53.33 / 8 = (6.7) * 1.18 = \underline{7.9} \text{ persons}$$

Area 8 - is the area used to stage and outload LOGAIR, air freight, air challenge, and FMS shipments. Current personnel levels are used in this area since operations here should not change.

Estimated manning requirements for Area 8

Outloading Priority Freight (Non-EDDS/FMS, OS)

Standard: Current Levels are Used

Current level = 3.0 persons

Area 9 - is the area from which small parcels are shipped. This area is not shown on the attached diagram. Current personnel levels are used in this area since operations here should not change.

Estimated manning requirements for Area 9

Outloading Small Parcels - Surface and Air

Standard: Current Levels are Used

Current level = 19.0 persons

b. Total Estimated Manning Requirements for DDMT - All Areas

Where a fraction of a man is required, the number of persons needed was rounded up to the next whole number.

<u>Area</u>	<u>Persons</u>
1	2.0
2	14.0
3	14.0
4	3.0
5	4.0
6	7.0
7	8.0
8	3.0
9	19.0
Weekend	20.0
Weekend - small parcels	10.0
Sub-Total	104.0
Supervisory	12.0
Weekend Supervisors	3.0
<b>TOTAL ESTIMATED PERSONS</b>	<b>119.0</b>

2. Defense Depot Tracy, CA (DDTC)

a. DDTC is broken down into seven areas for costing and manning purposes. The DOSO design of this freight terminal is shown in Figure D-2. Flows from central pack and the outlying warehouses constitutes DDTC's internally generated freight flow into the system.

Area 1 - includes the internally generated flow of pieces and unitized freight from central pack and the outlying warehouses. Approximately 2863 pieces and 389 pallets will come from this area. All pieces will move onto the automated system by carton conveyor. The pallets will be unitized in central pack and the outlying warehouses and will enter the freight terminal by transporter or pallet conveyor. Loose pieces will be on pallets for movement within the freight terminal. It is estimated that the loose pieces will represent some 572 pallets with an average five pieces per pallet.

Estimated manning requirements for Area 1

Insure Flow of Pallets onto Conveyer System

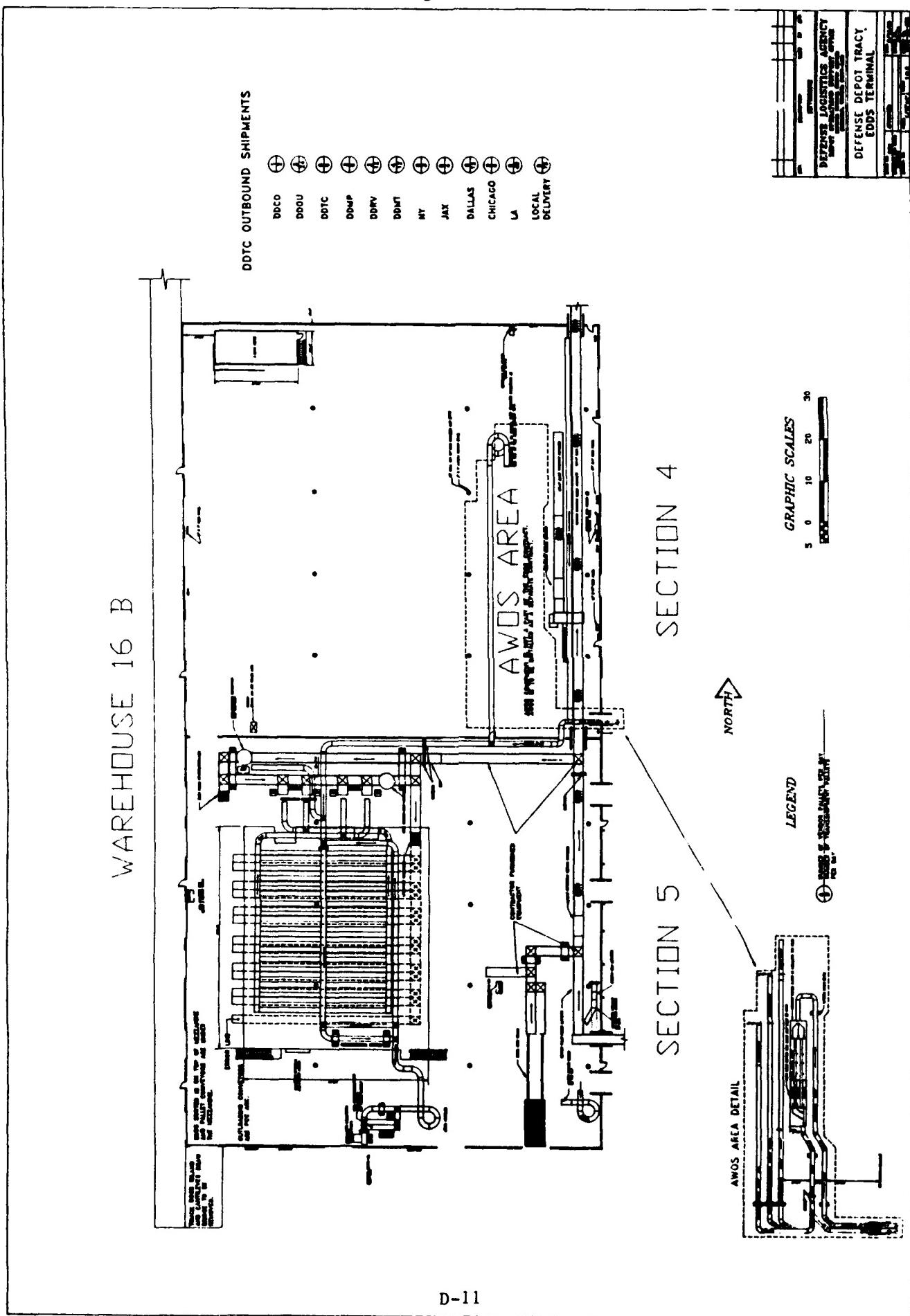
Standard: None

961 pallets = 1.0 person

Area 2 - is the receiving area. In this area material from vendors and DLA depot transshipments will be received. At the extendible conveyor it is estimated that 148 pieces will be received from vendors. The depalletization station will receive 12 vendor and 42 transshipment pallets that will be stripped into 120 vendor pieces and 476 transshipment pieces. The vendor pieces will be directed through the data collection workstations while the transshipment pieces will be pre-marked and will bypass the data collection stations. The data collection workstation will process some 268 pieces of vendor material per day.

Full pallets marked for a customer will be directed down a pallet conveyor. Pallets that are transshipments to DDTC insector LTL, dedicated truck, and high volume customers will not need further data collection. Vendor pallets will require data collection and marking prior to moving onto the outloading conveyor. Vendor pallets will number 1 while insector LTL, dedicated truck, and high volume customer pallets will be approximately 64.

Figure D-2



Estimated manning requirements for Area 2 - Receiving Vendor Material

Unload Commercial Carrier Having a Mixture of Pallets and Individual Containers - Vendor and Transshipment

Standard: Central Receiving (LTL)-Bin - 3221

Element A, Prepare Carrier for Unloading, all steps.

Element B, Receive Container, steps 1, 2, 3, 5, 7, 8, 9, 10, 18, 33, 35.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
Element A, All	.0997	.0039	.0004
Element B, 1	.0016	.004	.0001
2	.0006	.002	.0001
5	.0006	.004	.0001
7	.0378	.004	.0001
8	.0076	1.050	.0080
9	.0022	.050	.0001
10	.0031	1.000	.0031
18	.0039	.004	.0001
33	.0288	.080	.0023
35	.0174	.080	.0014
TOTAL NORMAL TIME			.0155
x P.F. & D. 11.4%			
STANDARD TIME			.0173

267 pieces/pallets x .0173 = 4.61 / 8 = (.58)\*1.18 = .68 persons

Depalletize Vendor and Transshipment Material

Standard: Central Receiving (LTL)-Bulk - 3202

Element C, Unloading pallet, steps 2, 6, 13.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
2	.0028	1.000	.0028
6	.0131	1.000	.0131
13	.0041	9.529	.0390
TOTAL NORMAL TIME			.0549
x P.F. & D. 11.4%			
STANDARD TIME			.0612

54 pallets x .0612 = 3.30 / 8 = (.41)\*1.18 = .49 persons

Data Collection Workstation - Vendor Cartons

Standard: DOSO Developed - Mechanized

$$268 \text{ pieces} \times .0136 = 3.64 / 8 = (.46) * 1.18 = .54 \text{ persons}$$

Area 3 - is the carton sorter. It is estimated that approximately 3607 pieces will be directed through the sorter. All 3607 pieces will be sorted to dedicated truck, high volume, other EDDS sites (outsector LTL), and insectector LTL locations. Sources for this material are 2863 pieces from DDTC, 268 pieces from vendors, and 476 from other EDDS sites.

Pallets built by the sorter at the 4 workstations are estimated as follows: 26 vendor material destined for central receiving at DDTC and the other DLA depots; 114 transshipments destined to other EDDS sites, and 63 dedicated truck, high volume customers, and insectector LTL. Approximately 228 pallets containing loose pieces will also be built in the sort area for movement to the LTL outload area.

Estimated manning requirements for Area 3 - Carton sorter

Sorter, Shrink Wrap, Error Processing, Verification Workstation

Standard: DOSO Developed - Mechanized

Sort/pallet build	(4.0)*1.18 = 4.7
Stretch/shrink wrap	(1.0)*1.18 = 1.2
Error processing	(.02)*1.18 = .02

Total                   5.9 persons

Areas 4 & 5 - is for outloading vendor material to DDTC central receiving, other depots central receiving, other EDDS sites, and insectector LTL.

Estimates for outloading insectector LTL, high volume customers, and dedicated trucks.

1274 pieces  
245 pallets

Total - 1519

Estimates for vendor outloading by site are:

DDMT - 6 pallets  
DDRV - 4 pallets  
DDMP - 5 pallets  
DDCO - 2 pallets  
DDOU - 3 pallets  
DDTC - 7 pallets

Total - 27

Estimates for transshipment material are:

DDRV - 28 pallets  
DDMP - 30 pallets  
DDCO - 3 pallets  
DDOU - 78 pallets  
DDMT - 25 pallets  
Dallas - 19 pallets  
Chicago - 3 pallets  
Jacksonville - 11 pallets  
New York - 3 pallets  
Los Angeles - 146 pallets

Total - 356

Estimates manning requirements for Area 4 & 5

Outloading Transshipments and Vendor Material

Standard: Freight Terminal Shipping Operations - 3340

Element D, all steps.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
All	.0339	1.000	.0339
		TOTAL NORMAL TIME	.0339
		x P.F. & D. 11.4%	
		STANDARD TIME	.0378

1902 pieces/pallets x .0378 = 71.89 / 8 = (8.9)\*1.18 = 10.6  
Error processing (1.0)\*1.18 = 1.2

Total 11.8 persons

Area 6 - is the area used to stage and outload air freight, air challenge, and FMS shipments. Current personnel levels are used in this area since operations here should not change.

Estimated manning requirements for Area 6

Outloading Priority Freight (Non-EDDS/FMS, OS)

Standard: Current Levels are Used

Current level = 2.0 persons

Area 7 - is the area from which small parcels are shipped. This area is not shown on the attached diagram. Current personnel levels are used in this area since operations here should not change.

Estimated manning requirements for Area 7

Outloading Small Parcels - Surface and Air

Standard: Current Levels are Used

Current level = 2.0 persons

b. Total Estimated Manning Requirements for DDTC - All Areas

Where a fraction of a man is required, the number of persons needed was rounded up to the next whole number.

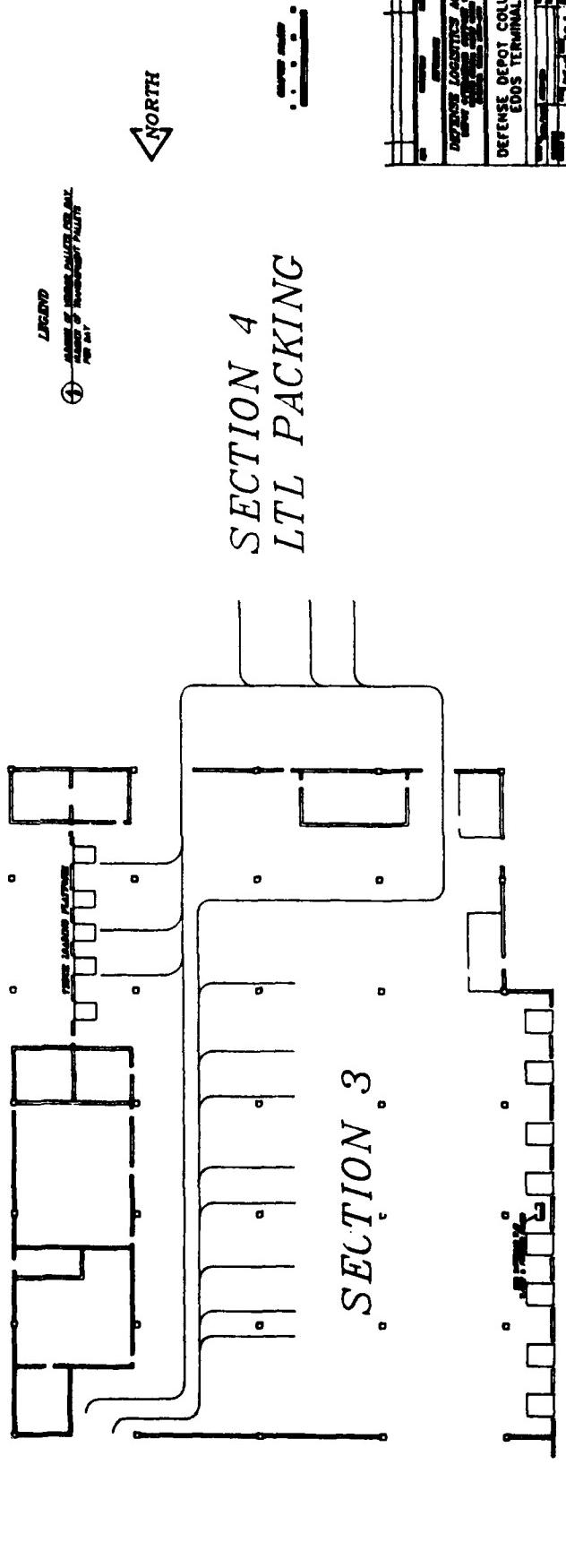
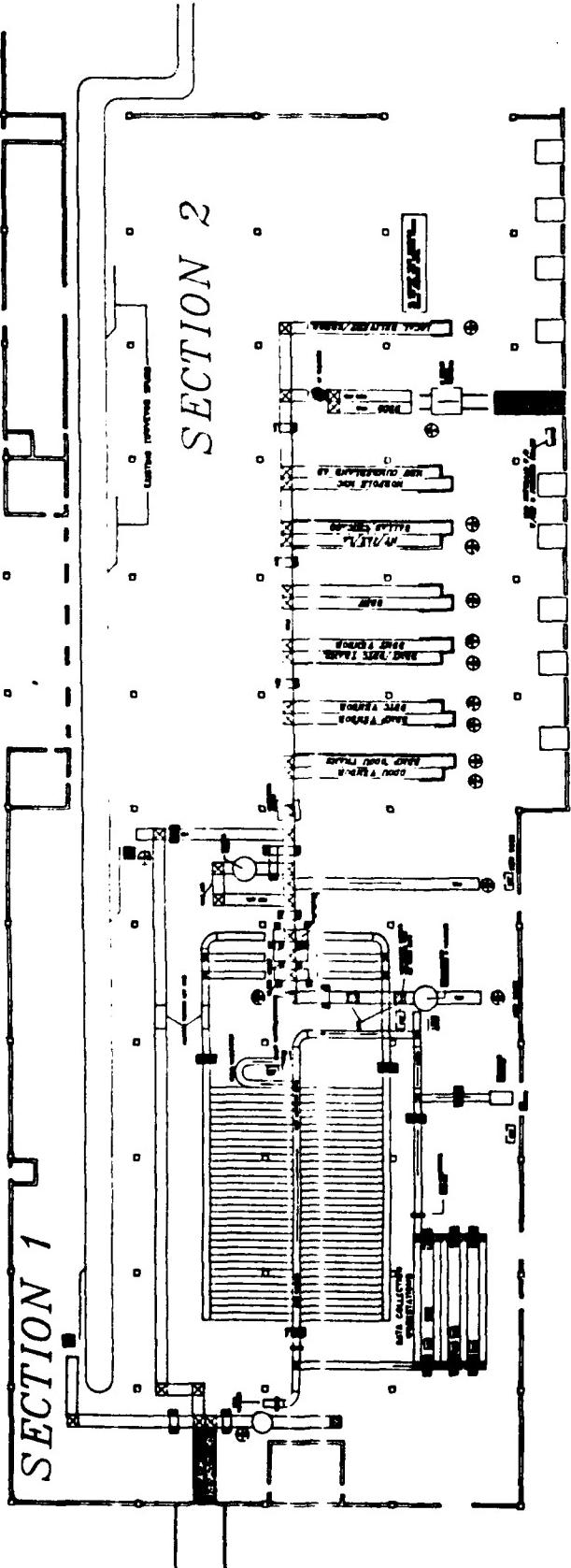
<u>Area</u>	<u>Persons</u>
1	1.0
2	3.0
3	6.0
4/5	12.0
6	2.0
7	2.0
Weekend	5.0
Sub-Total	31.0
Supervisory	4.0
Weekend Supervisors	1.0
TOTAL ESTIMATED PERSONS	36.0

3. Defense Depot Columbus, OH (DDCO)

a. DDCO is broken down into seven areas for costing and manning purposes. The DOSO design for this freight terminal is shown in Figure D-3. Flows from central pack and the outlying warehouses constitute DDCO's internally generated freight flow into the system.

Area 1 - includes the internally generated flow of pieces and unitized freight from central pack and the outlying warehouses. Approximately 827 pieces and 162 pallets will come from this area. It is estimated that the loose pieces will represent some 165 pallets with an average five pieces per pallet. Loose pieces will move into the freight terminal via the towveyor system or will be transferred to a roller conveyor by intradepot transporter. Pieces will then be transferred to the carton conveyor manually at a depalletization station. Full pallets will move onto the pallet conveyor system either from the towveyor system or the intradepot transporter.

Figure D-3



**WAREHOUSE 17**

Estimated manning requirements for Area 1

Depalletize Intradepot Material

Standard: Central Receiving (LTL)-Bulk - 3202

Element C, Unloading pallet, steps 2, 6, 13.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
2	.0028	1.000	.0028
6	.0131	1.000	.0131
13	.0041	5.000	.0205
TOTAL NORMAL TIME			.0364
x P.F. & D. 11.4%			
STANDARD TIME			.0405

$$165 \text{ pallets} \times .0405 = 6.68 / 8 = (.83) * 1.18 = .99 \text{ persons}$$

Area 2 - is the receiving area. In this area material from vendors and DLA depot transshipments will be received. At the extendible conveyor it is estimated that 970 pieces will be received from vendors. The depalletization station will receive 102 vendor and 23 transshipment pallets that will be stripped into 1330 vendor pieces and 238 transshipment pieces. The vendor pieces will be directed through the data collection workstations while the transshipment pieces will be pre-marked and will bypass the data collection stations. The data collection workstation will process some 2300 pieces of vendor material per day.

Full pallets marked for a customer will be directed down a pallet conveyor. Pallets that are transshipments to DDCO insector LTL, dedicated truck, and high volume customers will not need further data collection. Vendor pallets will require data collection and marking prior to moving onto the outloading conveyor. Vendor pallets will number 23 while insector LTL, dedicated truck, and high volume customer pallets will be approximately 36.

Estimated manning requirements for Area 2 - Receiving Vendor Material

Unload Commercial Carrier Having a Mixture of Pallets and Individual Containers - Vendor and Transshipment

Standard: Central Receiving (LTL)-Bin - 3221

Element A, Prepare Carrier for Unloading, all steps.

Element B, Receive Container, steps 1, 2, 3, 5, 7, 8, 9, 10, 18, 33, 35.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
Element A, All	.0997	.0039	.0004
Element B, 1	.0016	.004	.0001
2	.0006	.002	.0001
5	.0006	.004	.0001
7	.0378	.004	.0001
8	.0076	1.050	.0080
9	.0022	.050	.0001
10	.0031	1.000	.0031
18	.0039	.004	.0001
33	.0288	.080	.0023
35	.0174	.080	.0014
TOTAL NORMAL TIME			.0155
x P.F. & D. 11.4%			
STANDARD TIME			.0173

1095 pieces/pallets x .0173 = 18.9 / 8 = (2.37)\*1.18 = 2.8 persons

Depalletize Vendor and Transshipment Material

Standard: Central Receiving (LTL)-Bulk - 3202

Element C, Unloading pallet, steps 2, 6, 13.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
2	.0028	1.000	.0028
6	.0131	1.000	.0131
13	.0041	9.529	.0390
TOTAL NORMAL TIME			.0549
x P.F. & D. 11.4%			
STANDARD TIME			.0612

125 pallets x .0612 = 7.65 / 8 = (.96)\*1.18 = 1.1 persons

Data Collection Workstation - Vendor Cartons

Standard: DOSO Developed - Mechanized

$$2300 \text{ pieces} \times .0136 = 31.28 / 8 = (3.9) * 1.18 = \underline{4.6} \text{ persons}$$

Area 3 - is the carton sorter. It is estimated that approximately 3365 pieces will be directed through the sorter. All 3365 pieces will be sorted to dedicated truck, high volume, other EDDS sites (outsector LTL), and insector LTL locations. Sources for this material are 827 pieces from DDCO, 2300 pieces from vendors, and 238 from other EDDS sites.

Pallets built by the sorter at the 6 workstations are estimated as follows: 203 vendor material destined for central receiving at DDCO and the other DLA depots; 79 transshipments destined to other EDDS sites, and 12 dedicated truck, high volume customers, and insector LTL. Approximately 47 pallets containing loose pieces will also be built in the sort area for movement to the LTL outload area.

Estimated manning requirements for Area 3 - Carton sorter

Sorter, Shrink Wrap, Error Processing, Verification Workstation

Standard: DOSO Developed - Mechanized

Sort/pallet build	(4.0)*1.18 = 4.7
Stretch/shrink wrap	(1.0)*1.18 = 1.2
Error processing	(.03)*1.18 = .04

Total                    5.9 persons

Areas 4 & 5 - is for outloading vendor material to DDCO central receiving, other depots central receiving, other EDDS sites, and insector LTL.

Estimates for outloading insector LTL, high volume customers, and dedicated trucks.

233 pieces  
57 pallets

Total - 290

Estimates for vendor outloading by site are:

DDMT - 50 pallets  
DDRV - 16 pallets  
DDMP - 35 pallets  
DDCO - 43 pallets  
DDOU - 39 pallets  
DDTC - 43 pallets

Total - 226

Estimates for transshipment material are:

DDRV - 37 pallets  
DDMP - 64 pallets  
DDTC - 14 pallets  
DDOU - 11 pallets  
DDMT - 35 pallets  
Dallas - 9 pallets  
Chicago - 27 pallets  
Jacksonville - 7 pallets  
New York - 13 pallets  
Los Angeles - 11 pallets

Total - 228

Estimates manning requirements for Area 4 & 5

Outloading Transshipments and Vendor Material

Standard: Freight Terminal Shipping Operations - 3340

Element D, all steps.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
All	.0339	1.000	.0339
		TOTAL NORMAL TIME	.0339
		x P.F. & D. 11.4%	
		STANDARD TIME	.0378
744 pallets x .0378 = 28.12 / 8 = (3.5)*1.18 = 4.1			
Error processing		(1.0)*1.18 = <u>1.2</u>	
		Total	<u>5.3</u> persons

Area 6 - is the area used to stage and outload air freight, air challenge, and FMS shipments. Current personnel levels are used in this area since operations here should not change.

Estimated manning requirements for Area 6

Outloading Priority Freight (Non-EDDS/FMS, OS)

Standard: Current Levels are Used

Current level = 4.0 persons

Area 7 - is the area from which small parcels are shipped. This area is not shown on the attached diagram. Current personnel levels are used in this area since operations here should not change.

Estimated manning requirements for Area 7

Outloading Small Parcels - Surface and Air

Standard: Current Levels are Used

Current level = 0.0 persons

b. Total Estimated Manning Requirements for DDCO - All Areas

Where a fraction of a man is required, the number of persons needed was rounded up to the next whole number.

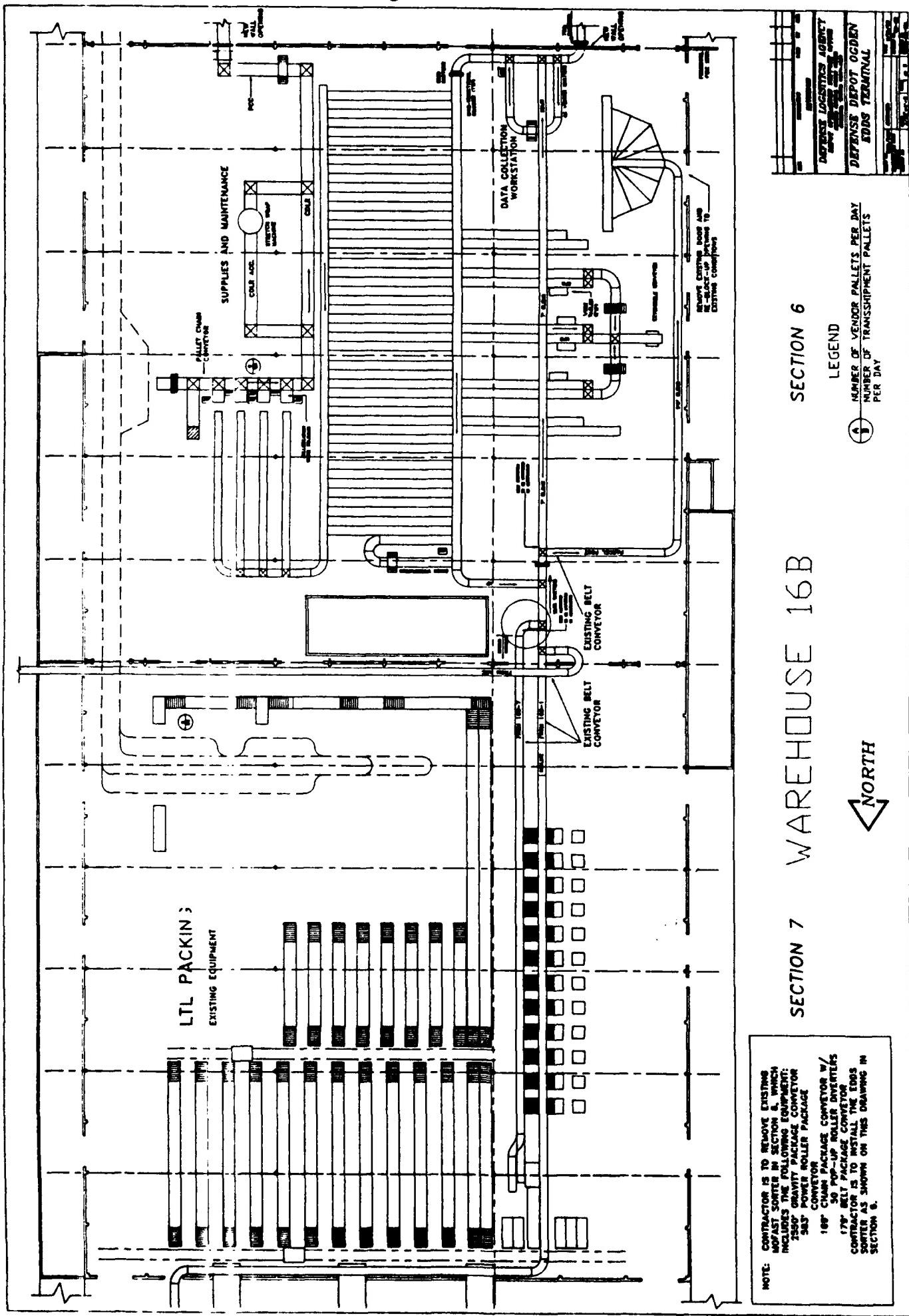
<u>Area</u>	<u>Persons</u>
1	1.0
2	10.0
3	6.0
4/5	6.0
6	4.0
7	0.0
Weekend	12.0
Sub-Total	39.0
Supervisory	4.0
Weekend Supervisors	2.0
TOTAL ESTIMATED PERSONS	45.0

4. Defense Depot Ogden, UT (DDOU)

a. DDOU is broken down into seven areas for costing and manning purposes. The DOSO design of this freight terminal is shown in Figure D-4. Flows from central pack and the outlying warehouses constitute DDOU's internally generated freight flow into the system.

Areas 1a and 1b - includes the internally generated flow of pieces and unitized freight from central pack and the outlying warehouses. Approximately 934 pieces and 158 pallets will come from this area. Loose pieces will move into the freight terminal via carton conveyor and will go directly to the sorter. Full pallets will move onto the pallet conveyor system by AGV system.

Figure D-4



Estimated manning requirements for Areas 1a and 1b

Insure Flow of Material into the Freight Terminal

Standard: None

$$(1.0)*1.18 = \underline{1.2} \text{ persons}$$

Area 2 - is the receiving area. In this area material from vendors and DLA depot transshipments will be received. At the extendible conveyor it is estimated that 66 pieces will be received from vendors. The depalletization station will receive 42 transshipment pallets that will be stripped into 427 transshipment pieces. The vendor pieces will be directed through the data collection workstations while the transshipment pieces will be pre-marked and will bypass the data collection stations. The data collection workstation will process some 66 pieces of vendor material per day.

Full pallets marked for a customer will be directed down a pallet conveyor. Pallets that are transshipments to DDOU insector LTL, dedicated truck, and high volume customers will not need further data collection. Any vendor pallets will require data collection and marking prior to moving onto the outloading conveyor. The number of pallets to insector LTL, dedicated truck, and high volume customers will be approximately 62.

Estimated manning requirements for Area 2 - Receiving Vendor Material

Unload Commercial Carrier Having a Mixture of Pallets and Individual Containers - Vendor and Transshipment

Standard: Central Receiving (LTL)-Bin - 3221

Element A, Prepare Carrier for Unloading, all steps.

Element B, Receive Container, steps 1, 2, 3, 5, 7, 8, 9, 10, 18, 33, 35.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
Element A, All	.0997	.0039	.0004
Element B, 1	.0016	.004	.0001
2	.0006	.002	.0001
5	.0006	.004	.0001
7	.0378	.004	.0001
8	.0076	1.050	.0080
9	.0022	.050	.0001
10	.0031	1.000	.0031
18	.0039	.004	.0001
33	.0288	.080	.0023
35	.0174	.080	.0014

$$\begin{aligned} \text{TOTAL NORMAL TIME} &= .0155 \\ \times \text{P.F. \& D. } 11.4\% & \end{aligned}$$

$$\text{STANDARD TIME} = .0173$$

$$170 \text{ pieces/pallets} \times .0173 = 2.9 / 8 = (.37)*1.18 = \underline{.43} \text{ persons}$$

Depalletize Vendor and Transshipment Material

Standard: Central Receiving (LTL)-Bulk - 3202

Element C, Unloading pallet, steps 2, 6, 13.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
2	.0028	1.000	.0028
6	.0131	1.000	.0131
13	.0041	9.529	.0390
TOTAL NORMAL TIME			.0549
x P.F. & D. 11.4%			
STANDARD TIME			.0612

$$42 \text{ pallets} \times .0612 = 2.57 / 8 = (.32) * 1.18 = .38 \text{ persons}$$

Data Collection Workstation - Vendor Cartons

Standard: DOSO Developed - Mechanized

$$66 \text{ pieces} \times .0136 = .90 / 8 = (.11) * 1.18 = .13 \text{ persons}$$

Area 3 - is the carton sorter. It is estimated that approximately 1427 pieces will be directed through the sorter. All 1427 pieces will be sorted to dedicated truck, high volume, other EDDS sites (vendor and outsector LTL), and insector LTL locations. Sources for this material are 934 pieces from DDOU, 66 pieces from vendors, and 427 from other EDDS sites.

Pallets built by the sorter at the 4 workstations are estimated as follows: 6 vendor material destined for central receiving at DDOU and the other DLA depots; 73 transshipments destined to other EDDS sites, and 23 dedicated truck, high volume customers, and insector LTL. Approximately 91 pallets containing loose pieces will also be built in the sort area for movement to the LTL outload area. One hundred two pallets will have to be stretch/shrink wrapped prior to being moved to the outload areas.

Estimated manning requirements for Area 3 - Carton sorter

Sorter, Shrink Wrap, Error Processing, Verification Workstation

Standard: DOSO Developed - Mechanized

Sort/pallet build	(2.5)*1.18 - 3.0
Stretch/shrink wrap	(1.0)*1.18 - 1.2
Error processing	(.02)*1.18 - .02

Total 4.2 persons

Areas 4 & 5 - is for unloading vendor material to DDOU central receiving, other depots central receiving, other EDDS sites, and insector LTL.

Estimates for unloading insector LTL, high volume customers, and dedicated trucks.

456 pieces  
129 pallets

Total - 585

Estimates for vendor unloading by site are:

DDMT/DDRV/DDMP - 3 pallets  
DDCO/DDTC/DDOU - 3 pallets

Total - 6

Estimates for transshipment material are:

DDMT/DDDRV/DDMP - 42 pallets  
DDCO/DDTC/DDOU - 52 pallets  
Dallas - 47 pallets  
New York/Jacksonville/Chicago - 15 pallets  
Los Angeles - 31 pallets

Total - 187

#### Estimates manning requirements for Area 4 & 5

##### Unloading Transshipments and Vendor Material

Standard: Freight Terminal Shipping Operations - 3340

Element D, all steps.

Step	Base	Freq	Normal
All	.0339	1.000	.0339

TOTAL NORMAL TIME .0339  
x P.F. & D. 11.48

STANDARD TIME .0378

778 pallets x .0378 = 29.41 / 8 = (3.7)\*1.18 = 4.4  
Error processing (1.0)\*1.18 = 1.2

Total 5.6 persons

Area 6 - is the area used to stage and outload air freight, air challenge, and FMS shipments. Current personnel levels are used in this area since operations here should not change.

Estimated manning requirements for Area 6

Outloading Priority Freight (Non-EDDS/FMS, OS)

Standard: Current Levels are Used

Current level = 4.0 persons

Area 7 - is the area from which small parcels are shipped. This area is not shown on the attached diagram. Current personnel levels are used in this area since operations here should not change.

Estimated manning requirements for Area 7

Outloading Small Parcels - Surface and Air

Standard: Current Levels are Used

Current level = 4.0 persons

b. Total Estimated Manning Requirements for DDOU - All Areas

Where a fraction of a man is required, the number of persons needed was rounded up to the next whole number.

<u>Area</u>	<u>Persons</u>
1	2.0
2	3.0
3	5.0
4/5	6.0
6	4.0
7	4.0
Weekend	0.0
Sub-Total	24.0
Supervisory	3.0
Weekend Supervisors	0.0
<b>TOTAL ESTIMATED PERSONS</b>	<b>27.0</b>

5. Defense Depot Richmond, VA (DDRV)

a. DDRV is broken down into seven areas for costing and manning purposes. The DOSO design for this freight terminal is shown in Figure D-5. Flows from central pack and the outlying warehouses constitute DDRV's internally generated freight flow into the system.

Area 1 - includes the internally generated flow of pieces and unitized freight from central pack and the outlying warehouses. Approximately 2397 pieces and 293 pallets will come from this area. Loose pieces will move into the freight terminal on pallets via pallet conveyor or AGV system and will have to be depalletized prior to going to the sorter. It is estimated that at five pieces per pallet the number of pallets with loose pieces will be 479. Full pallets will move onto the pallet conveyor system by AGV system.

Estimated manning requirements for Area 1

Depalletize Intradepot Shipment Material

Standard: Central Receiving (LTL)-Bulk - 3202

Element C, Unloading pallet, steps 2, 6, 13.

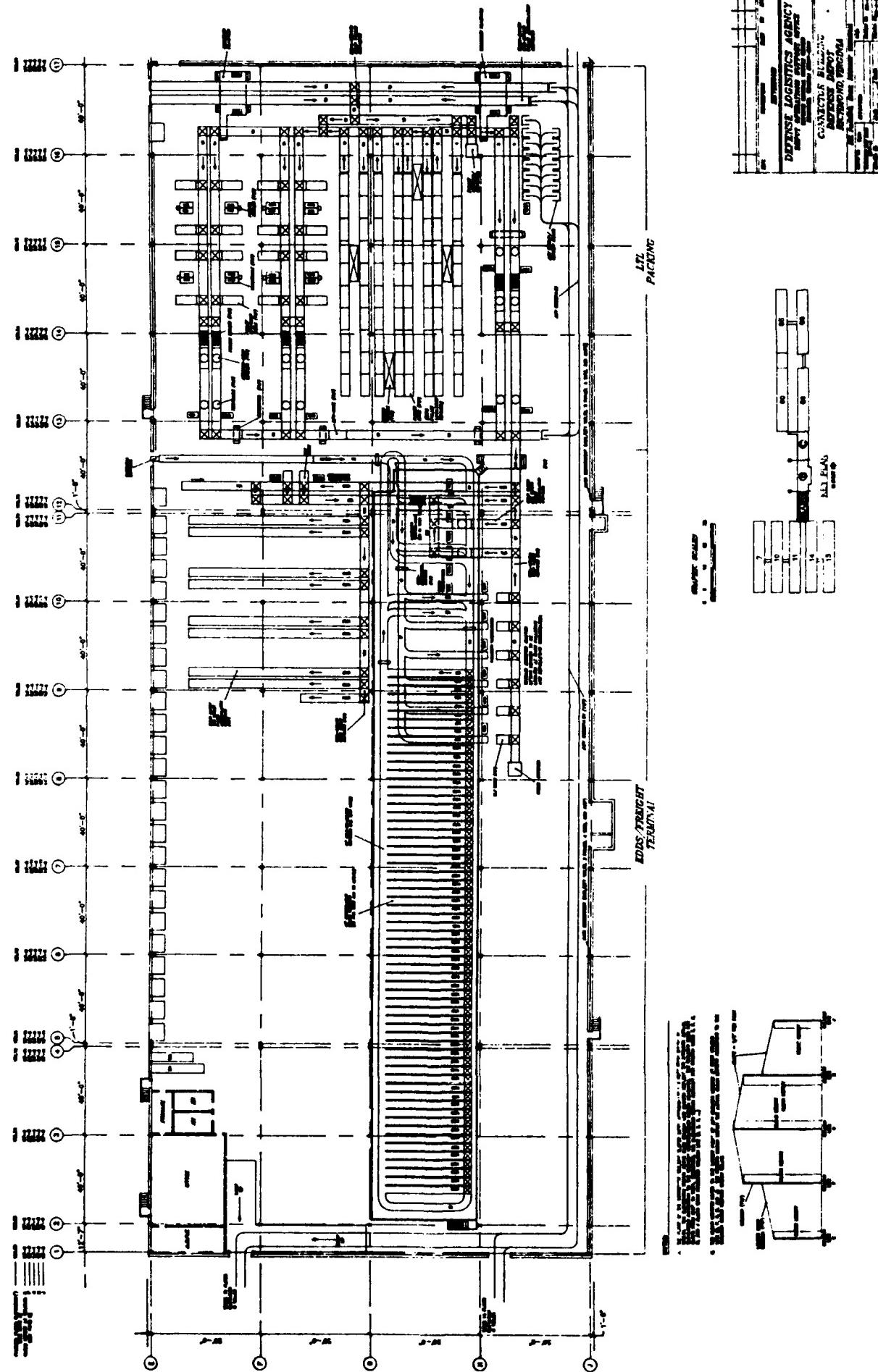
<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
2	.0028	1.000	.0028
6	.0131	1.000	.0131
13	.0041	5.000	.0205
TOTAL NORMAL TIME			.0364
x P.F. & D. 11.4%			
STANDARD TIME			.0405

$$479 \text{ pallets} \times .0405 = 19.40 / 8 = (2.42) * 1.18 = 2.9 \text{ persons}$$

Area 2 - is the receiving area. In this area material from vendors and DLA depot transshipments will be received. At the extendible conveyor it is estimated that 1294 pieces will be received from vendors. The depalletization station will receive 86 vendor and 69 transshipment pallets that will be stripped into 863 vendor and 690 transshipment pieces. The vendor pieces will be directed through the data collection workstations while the transshipment pieces will be pre-marked and will bypass the data collection stations. The data collection workstation will process some 2157 pieces of vendor material per day.

Full pallets marked for a customer will be directed down a pallet conveyor. Pallets that are transshipments to DDRV insecter LTL, dedicated truck, and high volume customers will need no further data collection. Approximately 19 vendor pallets will require data collection and marking prior to moving onto the outloading conveyor. The number of pallets to insecter LTL, dedicated truck, and high volume customers will be approximately 103.

Figure D-5



Estimated manning requirements for Area 2 - Receiving Vendor Material

Unload Commercial Carrier Having a Mixture of Pallets and Individual Containers - Vendor and Transshipment

Standard: Central Receiving (LTL)-Bin - 3221

Element A, Prepare Carrier for Unloading, all steps.

Element B, Receive Container, steps 1, 2, 3, 5, 7, 8, 9, 10, 18, 33, 35.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
Element A, All	.0997	.0039	.0004
Element B, 1	.0016	.004	.0001
2	.0006	.002	.0001
5	.0006	.004	.0001
7	.0378	.004	.0001
8	.0076	1.050	.0080
9	.0022	.050	.0001
10	.0031	1.000	.0031
18	.0039	.004	.0001
33	.0288	.080	.0023
35	.0174	.080	.0014
TOTAL NORMAL TIME			.0155
x P.F. & D. 11.4%			
STANDARD TIME			.0173

1571 pieces/pallets x .0173 = 27.2 / 8 = (3.4)\*1.18 = 4.0 persons

Depalletize Vendor and Transshipment Material

Standard: Central Receiving (LTL)-Bulk - 3202

Element C, Unloading pallet, steps 2, 6, 13.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
2	.0028	1.000	.0028
6	.0131	1.000	.0131
13	.0041	9.529	.0390
TOTAL NORMAL TIME			.0549
x P.F. & D. 11.4%			
STANDARD TIME			.0612

155 pallets x .0612 = 9.49 / 8 = (1.19)\*1.18 = 1.4 persons

Data Collection Workstation - Vendor Cartons

Standard: DOSO Developed - Mechanized

$$2157 \text{ pieces} \times .0136 = 29.33 / 8 = (3.8) * 1.18 = \underline{4.5} \text{ persons}$$

Area 3 - is the carton sorter. It is estimated that approximately 5244 pieces will be directed through the sorter. All 5244 pieces will be sorted to dedicated truck, high volume, other EDDS sites (vendor and outsector LTL), and insector LTL locations. Sources for this material are 2397 pieces from DDRV, 2157 pieces from vendors, and 690 from other EDDS sites.

The 307 pallets built by the sorter at 6 workstations are estimated as follows: 156 pallets of vendor material destined for central receiving at DDRV and the other DLA depots; 95 transshipments destined to other EDDS sites, and 56 dedicated truck, high volume customers, and insector LTL. Approximately 221 pallets containing loose pieces will also be built in the sort area for movement to the LTL outload area. Three hundred seven pallets will have to be stretch/shrink wrapped prior to being moved to the outload areas.

Estimated manning requirements for Area 3 - Carton sorter

Sorter, Shrink Wrap, Error Processing, Verification Workstation

Standard: DOSO Developed - Mechanized

Sort/pallet build	(5.8)*1.18 = 6.9
Stretch/shrink wrap	(2.0)*1.18 = 2.3
Error processing	(.03)*1.18 = .03

Total                            9.2 persons

Areas 4 & 5 - is for outloading vendor material to DDRV central receiving, other depots central receiving, other EDDS sites, and insector LTL.

Estimates for outloading insector LTL, high volume customers, and dedicated trucks.

1105 pieces  
280 pallets

Total - 1385

Estimates for vendor outloading by site are:

DDMT - 45 pallets  
DDRV - 36 pallets  
DDMP - 39 pallets  
DDCO - 3 pallets  
DDTC - 36 pallets  
DDOU - 16 pallets

Total - 175

Estimates for transshipment material are:

DDMT - 48 pallets  
DDMP - 83 pallets  
DDCO - 8 pallets  
DDTC - 32 pallets  
DDOU - 9 pallets  
Dallas - 21 pallets  
New York - 12 pallets  
Jacksonville - 37 pallets  
Chicago - 7 pallets  
Los Angeles - 10 pallets

Total - 267

Estimates manning requirements for Area 4 & 5

Outloading Transshipments and Vendor Material

Standard: Freight Terminal Shipping Operations - 3340

Element D, all steps.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
All	.0339	1.000	.0339
		TOTAL NORMAL TIME	.0339
		x P.F. & D. 11.4%	
		STANDARD TIME	.0378
1827 pieces/pallets x .0378 = 69.0 / 8 = (8.6)*1.18 = 10.2			
Error processing			(1.0)*1.18 = 1.2
		Total	<u>11.4 persons</u>

Area 6 - is the area used to stage and outload air freight, air challenge, and FMS shipments. Current personnel levels are used in this area since operations here should not change.

Estimated manning requirements for Area 6

Outloading Priority Freight (Non-EDDS/FMS, OS)

Standard: Current Levels are Used

Current level = 4.0 persons

Area 7 - is the area from which small parcels are shipped. This area is not shown on the attached diagram. Current personnel levels are used in this area since operations here should not change.

Estimated manning requirements for Area 7

Outloading Small Parcels - Surface and Air

Standard: Current Levels are Used

Current level = 0.0 persons

b. Total Estimated Manning Requirements for DDRV - All Areas

Where a fraction of a man is required, the number of persons needed was rounded up to the next whole number.

<u>Area</u>	<u>Persons</u>
1	3.0
2	11.0
3	10.0
4/5	12.0
6	4.0
7	0.0
Weekend	17.0
Sub-Total	57.0
Supervisory	6.0
Weekend Supervisors	1.0
TOTAL ESTIMATED PERSONS	64.0

6. Defense Depot Mechanicsburg, PA (DDMP)

a. DDMP is broken down into seven areas for costing and manning purposes. The DOSO design for this freight terminal is shown in Figure D-6. Flows from central pack and the outlying warehouses constitute DDMP's internally generated freight flow into the system. DDMP has additional missions for MEDALOC, DODDS, and CCP.

Area 1 - includes the internally generated flow of pieces and unitized freight from central pack and the outlying warehouses. Approximately 2578 pieces and 325 pallets will come from this area. Both pallets and loose pieces will move into the freight terminal on pallets via transporter with the loose pieces requiring depalletization prior to moving across the sorter. It is estimated that at five pieces per pallets the number of pallets with loose pieces will be 516. Full pallets will move onto the pallet conveyor system and continue on to the unloading area.

Estimated manning requirements for Area 1

Depalletize Intradepot Shipment Material

Standard: Central Receiving (LTL)-Bulk - 3202

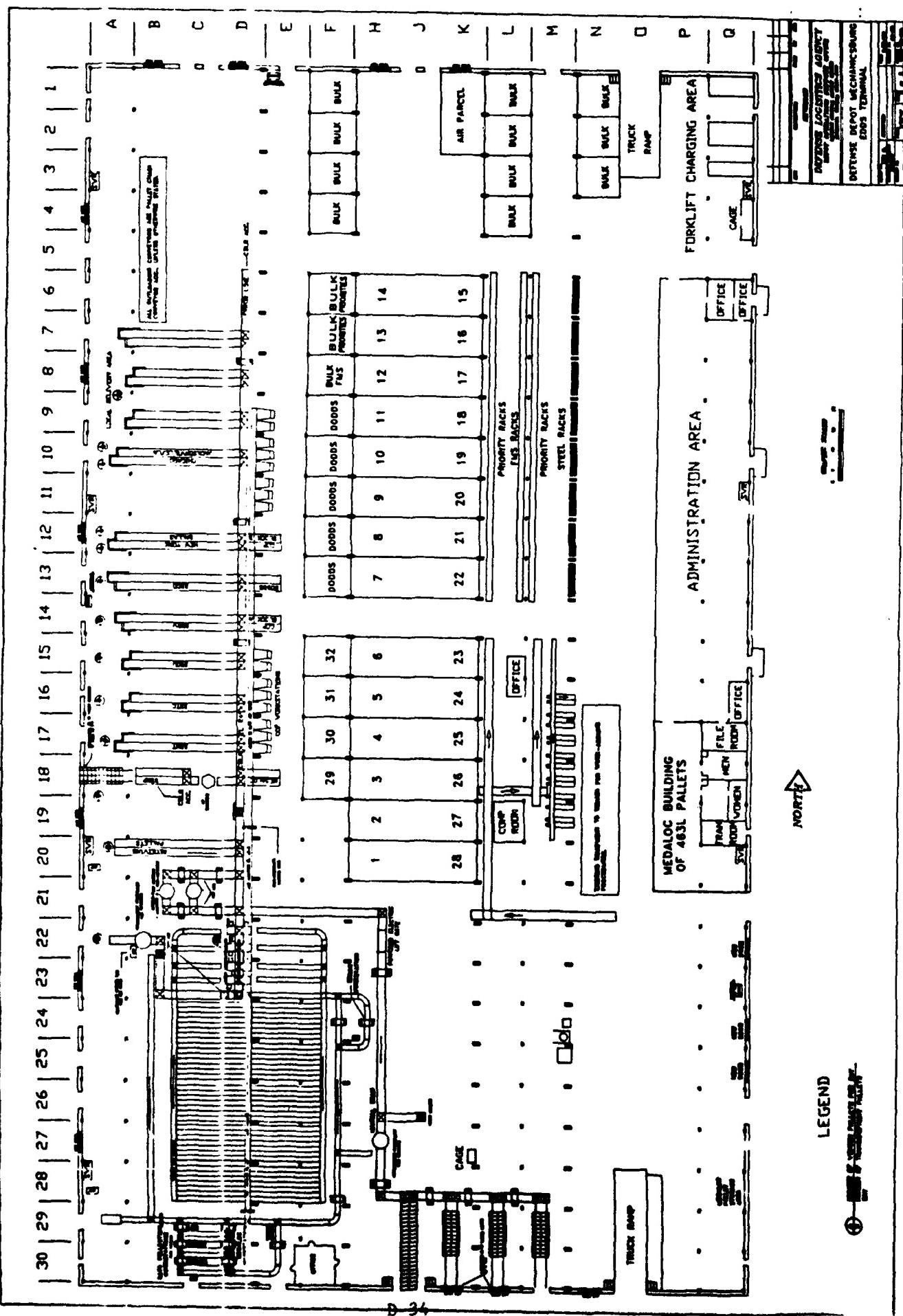
Element C, Unloading pallet, steps 2, 6, 13.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
2	.0028	1.000	.0028
6	.0131	1.000	.0131
13	.0041	5.000	.0205
TOTAL NORMAL TIME			.0364
x P.F. & D. 11.4%			
STANDARD TIME			.0405

$$516 \text{ pallets} \times .0405 = 20.89 / 8 = (2.61) * 1.18 = \underline{3.1} \text{ persons}$$

Area 2 - is the receiving area. In this area material from vendors, DLA depot transshipments, MEDALOC, and DODDS will be received. At the extendible conveyor it is estimated that 1830 vendor, 133 MEDALOC, and 168 DODDS pieces will be received. The depalletization station will receive 130 vendor, 45 transshipment, 20 CCP pallets that will be stripped into 1830 vendor, 587 transshipment, and 200 CCP pieces. The vendor pieces will be directed through the data collection workstations while the transshipment pieces will be pre-marked and will bypass the data collection stations. The data collection workstation will process some 3961 pieces of vendor, MEDALOC, and DODDS material per day.

Figure D-6



Full pallets marked for a customer will be directed down a pallet conveyor. Pallets that are transshipments to DDMR insector LTL, dedicated truck, high volume customers, and CCP will need no further data collection. Approximately 30 vendor pallets will require data collection and marking prior to moving onto the unloading conveyor. The number of pallets to insector LTL, dedicated truck, high volume customers, and CCP will be approximately 105.

Estimated Manning Requirements for Area 2 - Receiving Material

Unload Commercial Carrier Having a Mixture of Pallets and Individual Containers - Vendor and Transshipment

Standard: Central Receiving (LTL)-Bin - 3221

Element A, Prepare Carrier for Unloading, all steps.

Element B, Receive Container, steps 1, 2, 3, 5, 7, 8, 9, 10, 18, 33, 35.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
Element A, All	.0997	.0039	.0004
Element B, 1	.0016	.004	.0001
2	.0006	.002	.0001
5	.0006	.004	.0001
7	.0378	.004	.0001
8	.0076	1.050	.0080
9	.0022	.050	.0001
10	.0031	1.000	.0031
18	.0039	.004	.0001
33	.0288	.080	.0023
35	.0174	.080	.0014

TOTAL NORMAL TIME .0155  
x P.F. & D. 11.4%

STANDARD TIME .0173

2461 pieces/pallets x .0173 = 42.58 / 8 = (5.3)\*1.18 = 6.2 persons

Depalletize Vendor and Transshipment Material

Standard: Central Receiving (LTL)-Bulk - 3202

Element C, Unloading pallet, steps 2, 6, 13.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
2	.0028	1.000	.0028
6	.0131	1.000	.0131
13	.0041	9.529	.0390
	TOTAL NORMAL TIME		.0549
	x P.F. & D. 11.4%		
	STANDARD TIME		.0612

$$195 \text{ pallets} \times .0612 = 11.9 / 8 = (1.49) * 1.18 = \underline{1.8} \text{ persons}$$

Data Collection Workstation - Vendor Cartons

Standard: DOSO Developed - Mechanized

$$3961 \text{ pieces} \times .0136 = 53.86 / 8 = (6.7) * 1.18 = \underline{7.9} \text{ persons}$$

Area 3 - is the carton sorter. It is estimated that approximately 7326 pieces will cross the sorter daily. They will be directed as follows: 6423 pieces will be sorted to dedicated truck, high volume, other EDDS sites (vendor and outsector LTL), and insector LTL locations; 133 pieces will go to the MEDALOC shoots; 168 pieces to the DODDS shoots; and 602 pieces to the CCP shoots. The material that is sent down shoots will be staged for later outloading with the exception of MEDALOC. MEDALOC freight will be built into 463L pallets and shipped daily. Sources for this material are 2578 pieces from DDMP, 3660 vendor pieces, 133 MEDALOC pieces, 168 DODDS pieces, and 787 pieces from other EDDS sites.

The 450 pallets built by the sorter at 8 workstations are estimated as follows: 269 pallets of vendor material destined for central receiving at DDMP and the other DLA depots; 127 transshipments destined to other EDDS sites, and 54 dedicated truck, high volume customers, insector LTL, MEDALOC, DODDS, and CCP. Approximately 217 pallets containing loose pieces will also be built in the sort area for movement to the LTL outload area. Four hundred fifty pallets will have to be stretch/shrink wrapped prior to being moved to the outload areas.

Estimated manning requirements for Area 3 - Carton sorter

Sorter, Shrink Wrap, and Error Processing for Non-shoot Material

Standard: DOSO Developed - Mechanized

Sort/pallet build	(7.1)*1.18 = 8.4
Stretch/shrink wrap	(2.0)*1.18 = 2.3
Error processing	(.03)*1.18 = .03

Total      10.7 persons

Stage DODDS and CCP Material

Standard: Freight Terminal Shipping Operations - 3340

Element B, all steps except 8, 10, 11.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
All	.1003	1.000	.1003
		TOTAL NORMAL TIME	.1003
		x P. F. & D. 11.4%	
		STANDARD TIME	.1117

770 pieces x .1117 = 86.0 / 8 = (10.8)\*1.18 = 12.7 persons

Build 463L pallets for MEDALOC Material

Standard: Freight Terminal Shipping Operations - 3340

Element F, all steps.

<u>Step</u>	<u>Normal</u>
All	.0078
	TOTAL NORMAL TIME
	.0078
	x P. F. & D. 11.4%
	STANDARD TIME
	.0089

133 pieces x .0089 = 1.18 / 8 = (.14)\*1.18 = .2 persons

Areas 4 & 5 - is for outloading vendor material to DDMP central receiving, other depots central receiving, other EDDS sites, insector LTL, MEDALOC, DODDS, and CCP.

Estimates for outloading insector LTL, high volume customers, dedicated trucks, MEDALOC, DODDS, and CCP.

1087 pieces  
241 pallets

Total - 1328

Estimates for vendor outloading by site are:

DDMT - 72 pallets  
DDRV - 48 pallets  
DDMP - 63 pallets  
DDCO - 21 pallets  
DDTC - 60 pallets  
DDOU - 35 pallets

Total - 229

Estimates for transshipment material are:

DDMT - 50 pallets  
DDRV - 126 pallets  
DDCO - 19 pallets  
DDTC - 39 pallets  
DDOU - 13 pallets  
Dallas - 25 pallets  
New York - 54 pallets  
Jacksonville - 10 pallets  
Chicago - 14 pallets  
Los Angeles - 20 pallets

Total - 370

Estimates manning requirements for Area 4 & 5

Outloading Transshipments, Vendor, MEDALOC, DODDS, and CCP Material

Standard: Freight Terminal Shipping Operations - 3340

Element D, all steps.

<u>Step</u>	<u>Base</u>	<u>Freq</u>	<u>Normal</u>
All	.0339	1.000	.0339
		TOTAL NORMAL TIME	.0339
		x P.F. & D. 11.4%	
		STANDARD TIME	.0378
1997 pieces/pallets x .0378 = 75.5 / 8 = (9.4)*1.18 = 11.1			
Error processing			(1.0)*1.18 = <u>1.2</u>
		Total	<u>12.3</u> persons

Area 6 - is the area used to stage and outload air freight, air challenge, and FMS shipments. Current personnel levels are used in this area since operations here should not change.

Estimated manning requirements for Area 6

Outloading Priority Freight (Non-FDDS/FMS, OS)

Standard: Current Levels are Used

Current level = 4.0 persons

Area 7 - is the area from which small parcels are shipped. This area is not shown on the attached diagram. Current personnel levels are used in this area since operations here should not change.

Estimated manning requirements for Area 7

Outloading Small Parcels - Surface and Air

Standard: Current Levels are Used

Current level = 0.0 persons

b. Total Estimated Manning Requirements for DDMP - All Areas

Where a fraction of a man is required, the number of persons needed was rounded up to the next whole number.

<u>Area</u>	<u>Persons</u>
1	4.0
2	17.0
3	25.0
4/5	13.0
6	4.0
7	0.0
Weekend	0.0
Sub-Total	63.0
Supervisory	9.0
Weekend Supervisors	0.0
TOTAL ESTIMATED PERSONS	72.0

## APPENDIX E

### Undiscounted Costs for the Ten Year Life Cycle

Figures E-1 and E-2 present the ten year life cycle cost for all of the depots for each of the alternatives on a year by year basis. Also presented are the year by year incremental costs of each alternative. Figure E-3 presents the ten year life cycle costs broken down by depot and by element.

In these figures the term Mechanization refers to large scale MHE such as computer controlled conveyors and sorters. The cost for Mechanization is taken directly from DOSO design estimates. The term equipment in these figures refers to MHE currently in place at the depots. This equipment would include forklifts, jacks, ramps, etc. The cost and life expectancy of this equipment was taken from the DLAM 4505.1 MHE Cost Guide. The cost shown on the figures is the expected replacement cost to maintain the amount of equipment currently in use.

Labor costs were calculated on a depot by depot basis. To do this we used specific pay rate tables from each depot and the personnel requirements as presented in Appendices A through D.

The personnel requirements were separated into appropriate grades for each depot. Then we used an average hourly rate within that grade to calculate annual costs. The following is an example of the labor cost calculation:

\$10.00 per hr x (fringe benefit factor) x 2080 hrs (annual) x number of persons in the grade

This calculation was performed for each appropriate grade, then summed to determine total labor cost.

It is important to note that in projecting costs for labor (personnel) it was necessary to do some estimating. That is, if the calculations from an increased workload indicated that ten workers were needed to move the freight, then ten workers were costed out on an annual basis. If five workers were doing the job at the present, then the number was increased to ten keeping the same ratio of grades. In reality, this may not happen. Five workers may be added, all at the lowest grade possible. There was no way of forecasting how the grade structure would be with the addition of new employees. To cost labor in these cases, a mid-grade pay rate and a similar grade to grade ratio was used. For this reason, there may be a variance in the labor cost of plus or minus 5 percent.

**Figure E-1**  
**Cost Comparison of Mechanized versus Non-Mechanized**  
**for UTILIZATION/PALLETIZATION Without EDOS**

\*\*\*\* TOTAL OF ALL DEPOTS \*\*\*\*

**Undiscounted Costs - Mechanized Alternative**

Cost Element	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total
Mechanization	13,673,275	0	0	0	0	0	0	0	0	0	0 \$13,673,275
Equipment	504,000	504,000	504,000	504,000	504,000	504,000	504,000	504,000	504,000	504,000	\$5,040,000
Maintenance	683,663	1,367,327	1,367,327	1,367,327	1,367,327	1,367,327	1,367,327	1,367,327	1,367,327	1,367,327	\$12,989,606
Labor	6,155,372	6,155,372	6,155,372	6,155,372	6,155,372	6,155,372	6,155,372	6,155,372	6,155,372	6,155,372	\$61,553,720
Total	21,016,310	8,026,699	8,026,699	8,026,699	8,026,699	8,026,699	8,026,699	8,026,699	8,026,699	8,026,699	\$93,256,601

**Undiscounted Costs - Non-Mechanized Alternative**

Cost Element	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total
Mechanization	558,950	0	0	0	0	0	0	0	0	0	\$558,950
Equipment	504,000	504,000	504,000	504,000	504,000	504,000	504,000	504,000	504,000	504,000	\$5,040,000
Maintenance	27,947	55,894	55,894	55,894	55,894	55,894	55,894	55,894	55,894	55,894	\$530,993
Labor	8,394,355	8,394,355	8,394,355	8,394,355	8,394,355	8,394,355	8,394,355	8,394,355	8,394,355	8,394,355	\$83,943,550
Total	9,485,252	8,954,249	8,954,249	8,954,249	8,954,249	8,954,249	8,954,249	8,954,249	8,954,249	8,954,249	\$90,073,493

**Incremental Costs**

Cost Element	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total
MECHANIZED	12,665,549	(324,062)	(324,062)	(324,062)	(324,062)	(324,062)	(324,062)	(324,062)	(324,062)	(324,062)	\$9,748,991
NON-MECHANIZED	1,134,491	603,488	603,488	603,488	603,488	603,488	603,488	603,488	603,488	603,488	\$6,565,883

Figure E-2  
Cost Comparison of Mechanized vs Non-Mechanized vs COMMERCIAL  
for Operations Including the EDOS Throughput

All DEPOTS \$'000											
Undiscounted Costs - Mechanized Alternative											
Cost Element	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total
Mechanization	18,732,867	0	0	0	0	0	0	0	0	0	\$18,732,867
Equipment	504,000	504,000	504,000	504,000	504,000	504,000	504,000	504,000	504,000	504,000	\$5,040,000
Maintenance	936,438	1,873,287	1,873,287	1,873,287	1,873,287	1,873,287	1,873,287	1,873,287	1,873,287	1,873,287	\$17,796,221
Labor	8,818,114	8,818,114	8,818,114	8,818,114	8,818,114	8,818,114	8,818,114	8,818,114	8,818,114	8,818,114	\$88,181,140
Total	28,991,419	11,195,401	11,195,401	11,195,401	11,195,401	11,195,401	11,195,401	11,195,401	11,195,401	11,195,401	\$129,750,228

Undiscounted Costs - Non-Mechanized Alternative											
Cost Element	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total
Mechanization	1,411,569	0	0	0	0	0	0	0	0	0	\$1,411,569
Equipment	504,000	504,000	504,000	504,000	504,000	504,000	504,000	504,000	504,000	504,000	\$5,040,000
Maintenance	70,702	141,500	141,500	141,500	141,500	141,500	141,500	141,500	141,500	141,500	\$1,344,202
Labor	14,018,268	14,018,268	14,018,268	14,018,268	14,018,268	14,018,268	14,018,268	14,018,268	14,018,268	14,018,268	\$140,182,680
Total	16,004,539	14,463,748	14,463,748	14,463,748	14,463,748	14,463,748	14,463,748	14,463,748	14,463,748	14,463,748	\$147,978,451

Undiscounted Costs - Commercial Alternative											
Cost Element	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total
COMMERCIAL	5,490,271	5,490,271	5,490,271	5,490,271	5,490,271	5,490,271	5,490,271	5,490,271	5,490,271	5,490,271	\$54,902,710
Equipment	504,000	504,000	504,000	504,000	504,000	504,000	504,000	504,000	504,000	504,000	\$5,040,000
Labor	7,846,761	7,846,761	7,846,761	7,846,761	7,846,761	7,846,761	7,846,761	7,846,761	7,846,761	7,846,761	\$78,467,610
Total	13,801,032	13,801,032	13,801,032	13,801,032	13,801,032	13,801,032	13,801,032	13,801,032	13,801,032	13,801,032	\$138,410,320

Incremental Costs											
Cost Element	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total
MECHANIZED	20,660,858	2,844,640	2,844,640	2,844,640	2,844,640	2,844,640	2,844,640	2,844,640	2,844,640	2,844,640	\$242,640
NON-MECHANIZED	7,483,770	6,313,007	6,313,007	6,313,007	6,313,007	6,313,007	6,313,007	6,313,007	6,313,007	6,313,007	\$64,470,841
COMMERCIAL	5,490,271	5,490,271	5,490,271	5,490,271	5,490,271	5,490,271	5,490,271	5,490,271	5,490,271	5,490,271	\$54,992,710

Figure E-3

TOTAL UNDISCOUNTED LIFE-CYCLE COSTS FOR EACH DEPOT BY ELEMENT

MECHANIZED ALTERNATIVE FOR UTILIZATION/PALLETIZATION ONLY												
MECHANIZATION	EQUIPMENT	Maintenance	Labor	Total	MECHANIZATION	EQUIPMENT	Maintenance	Labor	Total			
D&MT	2,796,071	1,180,000	2,456,246	19,925,330	26,557,647	D&MT	3,725,318	1,180,000	3,539,052	29,125,500	37,569,870	
DO&O	1,711,157	570,000	1,625,602	7,545,670	11,432,429	DO&O	2,547,042	570,000	2,419,708	10,944,890	16,481,660	
D&MP	3,000,754	1,160,000	2,850,722	13,049,070	20,040,546	D&MP	3,963,767	1,140,000	3,765,570	17,754,160	26,623,505	
DO&C	2,288,413	500,000	2,173,980	6,546,400	11,509,793	DO&C	3,139,829	500,000	2,982,837	6,451,580	15,274,246	
DO&U	2,075,407	1,400,000	1,971,630	4,243,280	11,690,317	DO&U	2,772,818	1,400,000	2,634,177	8,244,310	15,071,305	
DO&V	1,801,473	250,000	1,711,406	8,243,970	12,006,849	DO&V	2,584,073	250,000	2,454,869	13,440,700	18,729,642	
<b>*TOTAL**</b>		<b>13,673,275</b>	<b>5,040,000</b>	<b>12,989,606</b>	<b>61,553,720</b>	<b>91,735,401</b>	<b>*TOTAL**</b>	<b>18,732,867</b>	<b>5,040,000</b>	<b>17,794,221</b>	<b>88,181,140</b>	<b>129,750,229</b>
NON-MECHANIZED ALTERNATIVE FOR UTILIZATION/PALLETIZATION ONLY												
MECHANIZATION	EQUIPMENT	Maintenance	Labor	Total	MECHANIZATION	EQUIPMENT	Maintenance	Labor	Total			
D&MT	114,000	1,180,000	108,300	23,957,640	25,359,940	D&MT	463,140	1,180,000	627,000	37,443,990	39,934,150	
DO&O	87,000	570,000	82,450	8,427,070	9,346,720	DO&O	149,502	570,000	142,500	20,618,710	21,480,712	
D&MP	114,200	1,160,000	108,490	15,389,400	16,752,290	D&MP	192,625	1,140,000	182,400	27,590,710	29,165,735	
DO&C	102,750	500,000	97,603	15,307,330	16,007,663	DO&C	156,850	500,000	152,000	19,191,000	19,999,080	
DO&U	38,250	1,400,000	34,328	7,715,280	9,188,658	DO&U	72,950	1,400,000	69,302	11,610,600	13,152,852	
DO&V	102,750	250,000	97,622	12,946,630	13,397,002	DO&V	176,502	250,000	171,000	23,707,630	24,305,152	
<b>*TOTAL**</b>		<b>588,950</b>	<b>5,040,000</b>	<b>530,973</b>	<b>83,943,550</b>	<b>90,073,893</b>	<b>*TOTAL**</b>	<b>1,411,569</b>	<b>5,040,000</b>	<b>1,344,202</b>	<b>140,182,600</b>	<b>147,978,451</b>
COMMERCIAL ALTERNATIVE INCLUDING EDGS THROUGHPUT												
COMMERCIAL	EQUIPMENT	Maintenance	Labor	Total	COMMERCIAL	EQUIPMENT	Maintenance	Labor	Total			
D&MT		12,131,600	1,180,000	22,025,470	D&MT		12,131,600	1,180,000	22,025,470	35,337,070		
DO&O		8,940,250	570,000	9,599,900	DO&O		15,004,130	1,140,000	12,337,260	28,481,390		
D&MP			4,339,150	500,000	D&MP			12,023,370	16,862,520			
DO&C			3,297,570	1,400,000	DO&C			14,479,260	19,176,830			
DO&U			11,190,010	250,000	DO&U			9,002,350	20,442,360			
<b>*TOTAL**</b>		<b>54,902,710</b>	<b>5,040,000</b>	<b></b>	<b></b>	<b></b>	<b></b>	<b></b>	<b></b>	<b>78,447,610</b>	<b>138,410,320</b>	

## APPENDIX F

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<p>This report details the costs and benefits of modernizing the freight terminals at the six Defense Logistics Agency (DLA) depots. The current designs are not adequate to handle additional demands of unitization and increased throughput. The results of this study indicate that several alternatives are feasible and cost effective. The study also describes in precise detail the resources required to implement each alternative. Finally, the analysis shows that an investment in large scale material handling equipment would be the best course of action for DLA. Implementing this alternative would provide DLA with the ability to meet all processing goals and afford an opportunity to experience considerable transportation savings.</p>					
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